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WANDERING: A BEHAVIOURAL ANALYSIS

BY

DORIS L. MILKE ©

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(Supervisor)

Michael W. Gillespie
....

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Date: June 13, 1989

DEDICATION

...for my family who have experienced the process of education with me and for the families who endure the process of Alzheimer's disease...

Abstract

The wandering of elderly persons suffering from dementia is a common problem that has serious and even dangerous outcomes. It has received surprisingly little research attention. A major problem in conducting research on wandering is the lack of a consensual definition of wandering. Even if the use of the term wandering is restricted to behavioural wandering, as opposed to mental wandering, all of the following meanings are evident in the meagre literature on this topic: aimless locomotion or pacing, searching, repetitious restless movements, having navigational difficulties, trespassing into other individuals' private territory, and absconding from rooms, wards, and institutions. In light of the diverse use of the word, the present research viewed "wandering" as a comprehensive term for a cluster of behaviours, rather than a term describing any particular behaviour. In Study 1 the behaviour of persons with Senile Dementia of the Alzheimer's Type was examined to determine the extent to which they exhibit the wandering behaviours described in the literature. The behavioural description of their wandering was based on systematic observations made under normal everyday institutional conditions. This was the first attempt at a behavioural analysis of wandering based on systematic observations of a subject population with a common diagnosis. Through statistical analysis of ongoing behaviours, some types of events that precipitate these various wandering behaviours were determined. A second study was done to compare caregivers ratings of the SDAT participants with the observational data. Another study focused on absconding from the ward and from the nursing home. A fourth study compared the demented participants with high-functioning residents in the nursing home. The results have implications for environmental design of long-term care institutions, the behavioural management and devices to control wandering behaviours, regulations which govern the freedom of institutional residents, and the legal responsibility of institutions for their residents.

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Table of Contents

I. INTRODUCTION 1

A. Background: Observational Studies of Wandering 3

B. Objectives 7

II. STUDY 1 9

A. Method 14

Subjects 14

Procedures 15

B. Results 20

Chi Square Partitioning 21

Event Based Probabilities 25

Lag Sequential Analyses 33

Time Based Probabilities 71

C. Discussion 77

The Concept of Wandering 82

III. STUDY 2 87

A. Method 90

Subjects 90

Instruments 90

Procedures 92

B. Results and Discussion 93

Caregivers' Judgements vs. Behavioural Data 94

Behavioural Analysis and Question One Results 94

Behavioural Results and The Wandering Index 97

Classic Test Theory 102

Indices of Agreement 103

Interrater Reliability 105

The Definitions of Wandering 106

The Questionnaire 114

C. Conclusion 116

IV. STUDY 3 120

A. Method 124

Subjects and Subject Classification 124

Procedures for Measuring Absconding 125

B. Results 126

C. Discussion 129

V. STUDY 4 134

A. Method 136

Subjects 136

Instruments 140

Procedures 144

B. Results 145

C. Discussion 160

VI. CONCLUSION 163

Comparisons with Other Behavioural Studies 165

How Dangerous Are Dangerous Wandering Behaviours? .. 168

Sequential Analyses of Wandering 170

The Choice of Wandering Behaviours 171

Future Research: What and Why 175

Implications for Management Strategies 184

REFERENCES 189

FOOTNOTES 202

APPENDIX A - Definitions of Wandering Behaviours 203
APPENDIX B - Participants' Medications 215
APPENDIX C - Coding Scheme for Focal Observations 220
APPENDIX D - Behaviour Definitions 224
APPENDIX E - Recoding Focal Observation Data 253
APPENDIX F - Correlations of Wandering Behaviours 266
APPENDIX G - Comparing Focal and Scan Methods 267
APPENDIX H - The Wandering Index 293
APPENDIX I - Instantaneous Scan Coding Scheme 298
APPENDIX J - Scan Instructions 301
APPENDIX K - Definitions for Scans 305

List of Tables

Table Page

1. Brief Description of Wandering Behaviours 10
2. Odds Ratios: Wandering Behaviours to Other Activities 23
3. Likelihood Ratio Chi Square Partitioning of Activities 24
4. Excessive Wanderers' Absconding from the Floor 52
5. Moderate Wanderers' Absconding from the Floor 53
6. Excessive Wanderers' Absconding from a Room 57
7. Moderate Wanderers' Absconding from a Room 59
8. Excessive Wanderers' Trespassing 62
9. Moderate Wanderers' Trespassing 63
10. Excessive Wanderers' Fiddling 66
11. Moderate Wanderers' Fiddling 67
12. Nonwanderers' Fiddling 69
13. Caregivers' Ratings of SDAT Participants 95
14. Wandering Index from Caregivers' Ratings 98
15. Indices of Agreement 103
16. Caregivers' Definitions of Wandering 107
17. Caregivers' Reasons SDAT Participants were not Wanderers .. 109
18. Characteristics of Participants 138
19. Time Spent in Activities when Restrained 153
20. Behaviour Frequencies Classified by Type 158
21. Likelihood Ratio Chi Square Partitioning of Activities 159

List of Figures

Figure Page

1. Event probabilities--SDAT participants' behaviours 31
2. Restless locomotion of moderate wanderers 35-37
3. Restless locomotion of excessive wanderers 45-47
4. Time spent in behaviours for three SDAT groups 74
5. Wandering Indices compared to odds ratios 101
6. Incidents of absconding from facility and floor 128
7. Floorplan for the second floor 142
8. Time spent in locations 148
9. Time spend in behaviours 152
10. Restraint of SDAT participants 157

WANDERING: A BEHAVIOURAL ANALYSIS

The wandering behaviours of elderly persons who suffer from dementia have become a major problem. Estimates indicate that 10 to 20 percent of the residents of nursing homes engage in wandering behaviours (Blasch, 1988; Dawson & Reid, 1987; Hiatt, 1988; Mann, Graham, & Ashby, 1984; Meacher, 1972). The problem does not only concern institutions, however, because families, neighbors and often police must deal with wandering behaviours ("Lost", "My name", 1987). One study of community-dwelling patients with Senile Dementia of the Alzheimer's Type (SDAT) found that four-fifths had wandered at some time since they developed the dementia and nearly two-fifths wandered frequently (George, 1983, cited in Rouse, Griffith, Trachtman, & Winfield, 1986). Based on the projected increase in the total population aged 65 and older, the expectation is that the number of wanderers will increase by more than one-third by the year 2000 (Rouse et al., 1986).

A search of the psychological and gerontological literature yields somewhat more than two dozen studies on older people who wander. This meagre literature is "largely descriptive and lacking in empirical data on the central features of the problem" (Dawson & Reid, 1987). The central focus is not the elucidation of the behaviours involved, but rather attempts to diminish the behaviours. Probably a major reason for this focus is the type of problems that wandering behaviours produce. Numerous legal actions have been filed in U.S. courts relating to wandering incidents in recent years (Evans & Strumpf, 1989; Staff, 1987). Some incidents have involved deaths. According to one review the nursing home industry is feeling the impact: "operating costs of monitoring a wanderer in a facility average $3,000 per year" and when the monitoring fails "Jobs have been lost; professional sanctions have been imposed; and administrators have been prosecuted for negligence in serious wanderer incidents" (Staff, 1987, p. 56,59). It is little wonder that wandering behaviours in institutions are routinely treated with devices and drugs that severely curtail the individual's movement (Brody, Lawton, & Liebowitz, 1984; Miller, 1976; Pynoos & Stacey, 1986). However, such strategies have often been unsuccessful (Staff, 1987). Restraints may have led to more deaths and accidents than the wandering behaviours they were intended to inhibit (Branzelle, 1988; Cape, 1983; Katz, Weber, & Dodge, 1981). Moreover, the use of physical restraints in community settings has been treated as a form of abuse (Rouse et al., 1986). Thus the people who must cope with wandering behaviours are still without adequate solutions to the problems such behaviours create.

Unfortunately, viewing wandering behaviours as an institutional problem has effectively removed attention from the behavioural process itself. As a consequence basic behavioural information is still unavailable. For example, no systematic observations of the sequence of behaviours in an absconding incident have been published. In another vein, the assumption has been made that persons who incessantly walk are those who abscond from their homes and institutions. The corollary is that demented persons who do not engage in such walking are not at risk of absconding. Neither assumption has been verified. There are, in fact, many behavioural questions to pose and as yet only a few preliminary studies have been conducted. The studies that have employed direct observation to investigate wandering behaviours will be reviewed before the questions addressed by the present research are outlined.

Observational Studies of Wandering Behaviours

Very few studies of wandering behaviours have used direct observation (cf., Hussian & Davis, 1983, cited in Hussian & Davis, 1985; and Martino-Saltzman, 1988) and only two reports have been published as separate studies (Meacher, 1972; Snyder, Rupprecht, Pyrek, Brekhus, & Moss, 1978). Both used behavioural mapping techniques and provided little data analysis.

There is general agreement in the observational studies that there are several different styles or types of wandering. Meacher's (1972) observations in six British long-term care facilities led him to describe two types of wandering, directed and aimless, which he distinguished from purposive walking. He characterized the aimless style of wandering, given its high frequency, as a compulsive activity with no obvious purpose and no apparent destination. Directed wandering, he said, had an apparent direction, was not compulsive, but was still different from what would commonly be called "going for a walk" or "stroll" (Meacher, 1972). Meacher noted that only the confused residents engaged in wandering behaviours and the more severely confused they were, the more wandering behaviours they exhibited.

Snyder et al. (1978) observed only eight wanderers, selected by staff members, but the wanderers were compared to eight nonwanderers, matched on mental status and several other variables. Wandering was defined as "a tendency to move about, either in a seemingly aimless or disoriented fashion, or in pursuit of a indefinable or unobtainable goal" (p. 272). However, the data consisted of locations and time-in-locomotion, not wandering as they defined it. No attempt was made to operationalize terms such as the "pursuit of an indefinable or unobtainable goal". In a *post hoc* analysis, Snyder et al. (1978) distinguished three types of wandering behaviours. These were (1) *overtly goal-directed/searching behaviour*, often associated with successively approaching others in pursuit of a goal (e.g., mother, home, abstract objects); (2) *overtly goal-directed/industrious behaviour*, characterized by a drive to remain busy but often just gesturing as if cleaning or performing work; and (3) behaviour that was apparently *nongoal-directed*, in which the subjects were drawn to a series of successive stimuli, often stating a goal but not pursuing it. No attempt was made to distinguish purposive locomotion.

They found wanderers were significantly more involved in nonsocial behaviours and were eight times more likely to be found walking. The fact that wandering was determined *post hoc*, evidently in much the same way that it was in Meacher's (1972) study, suggests that the purposes of locomotion cannot be easily determined at the beginning or during the locomotion. To date, there has been no published attempt to operationalize the Snyder et al. descriptions to see whether they help distinguish different types of wandering behaviour during subjects' locomotion.

Hussian and Davis (1985) cited an unpublished study in which they watched the locomotion of 13 wanderers on a locked ward. They defined wandering as ambulation that occurs independently of the usual environmental cues (activity announcements, invitations, etc.).

However, they mapped subjects' locations, noted the total time spent walking alone, and counted particular behaviours such as doorknob touching, asking to leave, and stereotypic behaviours such as repetitive picking, rubbing, vocalizations, manipulation and a peculiar "sanding" hand movement. A *post hoc* analysis discerned four substantially different types of wandering. The first, *akathisia* (a compulsion to walk), was manifested by two subjects who were very frequent walkers but did not show any interest in leaving the ward, nor did they engage in stereotypic behaviours. Furthermore, drug records indicated the akathisics were taking substantially higher doses than other subjects of neuroleptic medication, which often precipitates akathisia. A second pattern, *exit-seeking*, was exhibited by two subjects who appeared to be primarily interested in making an exit. They also did not engage in stereotypic behaviours. The third pattern, exhibited by four subjects, was called *modelling* because their locomotion occurred only in the presence of another's locomotion. The last pattern was *self-stimulatory walking*. It was manifested by five subjects who repetitiously touched the door knobs and doors as though they were receiving auditory and tactile stimulation from the activity. These subjects also exhibited other forms of stereotypy such as hand-clapping or rubbing objects. This latter style of walking may be analogous to what Snyder et al. (1978) call industrious behaviour and what Meacher (1972) termed as "fiddling".

To summarize, all of the types or patterns of locomotion described by the observational studies were differentiated *post hoc*. Thus, it seems reasonable to conclude that observers experienced considerable difficulty in applying labels such as aimless, purposive, and excessive to the locomotion while the behaviour is in progress. Interestingly, in spite of Hussian and Davis' (Hussian & Davis, 1983, cited by Hussian & Davis, 1985) interest in exit-seeking, none of the observational studies reported data on absconding or trespassing, the two wandering behaviours cited in the literature as being most apt to result in the wanderer being exposed to danger (Donat, 1986; Hiatt, 1988; McKeen & Coulter, 1987; Rader, 1987). The observational sessions, however, may have been too brief or too few to record incidents of absconding and trespassing and in Hussian and Davis' (Hussian & Davis, 1983, cited by Hussian & Davis, 1985) study the locked ward prohibited absconding. Additionally, none of the behavioural studies described the subjects as having navigational difficulties or appearing to be lost although it is a frequently mentioned component of wandering (Burnside, 1980).

As yet, our knowledge of wandering behaviours is only rudimentary. Very little is known about the behavioural sequences of absconding, trespassing, or even aimless locomotion. There are other fundamental questions. For example, do all residents of nursing homes, even high-functioning ones, engage in some wandering? Another question, concerns the validity of retrospective assessments of wandering behaviours. Even the Snyder et al. (1978) study began by asking staff members to classify wanderers and nonwanderers. Although such evaluations dominate reports on wandering behaviours, are the evaluations comparable to systematic behavioural observations? A question arising directly from the earlier observational studies is whether stereotypic patterns of behaviour define a style of wandering?

Direct observation of behaviour can answer all these questions. Although the questions about high-functioning residents and the validity of the retrospective assessment of wanderers may be resolved by counting the frequencies of wandering behaviours, other methods are necessary to unravel the sequencing of wandering behaviours and to reveal what behaviours occur in conjunction with wandering.

Objectives

The following questions guide the four studies described in the present report:

(1) To what extent do persons diagnosed as having SDAT exhibit the various behaviours entailed by the term wandering?

(2) What characteristics, if any, differentiate persons who engage extensively in wandering behaviours from those who do not?

(3) What patterns do each of the wandering behaviours take?

(4) What management implications, if any, can be derived from the answers to the foregoing questions?

(5) How do staff members categorize wanderers and nonwanderers and do staff members' retrospective characterizations match the characteristics obtained through systematic observation of the participants?

(6) What basis can be found for the assumption that demented persons who incessantly wander are those at greatest risk of absconding from a nursing home?

(7) If the same definitions of wandering behaviours were utilized for observations of both high-functioning residents and SDAT

residents, would even the high-functioning residents of a nursing homes be found to engage in some wandering?

The first study in the present report was devised to answer the first four questions. It is a prospective study of wandering behaviours using observational data from a systematic sampling of participants' behaviours and locations throughout the day. A detailed analysis is provided of the wandering activities manifested by 10 nursing home residents diagnosed with SDAT. Whether the participants' behaviour met specific criteria to qualify as wandering was determined *post hoc*, primarily because of the difficulty of determining whether ongoing locomotion was purposive or aimless.

The second study compared caregivers ratings of the SDAT participants' wandering behaviours with the observational data reported in Study 1 in order to evaluate the accuracy of the caregivers' assessments. This study considered the validity of retrospective assessments of wandering behaviours and question number five.

In Study 3 the incidents of absconding from the dementia wing of the nursing home, over a three-month period of time, were examined to ascertain whether there was a basis for the assumption outlined in question number six.

A fourth study compared the demented participants with high-functioning residents in the nursing home in order to ascertain, in answer to question number seven, whether wandering behaviours are exclusive to the behavioural repertoire of persons with dementia (i.e., are not exhibited by cognitively alert persons).

Study 1

A problem immediately arises in conducting an observational study of wandering behaviours because a clear definition of wandering is required. Unfortunately, there is no consensus on a definition and most definitions are difficult to translate into observational criteria. Various clinicians and researchers have used the term wandering in different ways. Some restrict its use to absconding. Others use it to describe navigational difficulty within territory that should be familiar. However, the word is most frequently used to describe a meandering locomotion that seems to have no purpose. Some researchers have emphasize that searching is a major component of wandering (Monsour & Robb, 1982; Snyder et al., 1978) and one has suggested that a variety of stereotypic behaviours characterize one form of wandering (Hussian & Davis, 1983, cited in Hussian & Davis, 1985). In order to take advantage of these diverse sources of information and study the interrelationship of these behavioural peculiarities wandering was treated as a concept, that is, an abstract or generic idea generalized from particular instances. Although the preferred term in this dissertation is *wandering behaviours*, when *wandering* is used, it is used as a comprehensive term for an specific array of behaviours.

Wandering was, therefore, operationally defined as the group of behaviours listed here. More description is provided in Table 1 and full definitions are found in Appendix A. Three levels of *absconding* were included: from rooms and/or activities, from the floor of the nursing home, and from the institution itself. Different levels of absconding reflected the different levels of danger to which the demented person could be exposed in various areas of the nursing home and on the street (Burnside, 1980; Cornbleth, 1977; Donat, 1986; Hussian & Brown, 1987; Martino-Saltzman, 1988; Oberleder, 1976). Both *restless locomotion* (Meacher, 1972) and *group walking* were included (Hussian & Davis, 1983, cited in Hussian & Davis, 1985). A motoric restlessness was also classified as a wandering behaviour. It was designated as "*fiddling*" and was characterized by fidgeting and stereotypic movements that often involving object manipulation (Hussian & Davis, 1983, cited in Hussian & Davis, 1985; Meacher, 1972). Three other behaviour were also considered to be wandering behaviours: *searching* (Monsour & Robb, 1982; Snyder et al., 1978), having *navigational difficulties* (Burnside, 1980; de Leon, Potegal, & Gurland, 1984), and *trespassing* into other individuals' private territory (Donat, 1986; Martino-Saltzman, 1988; Rosswurm, Zimmerman, Schwartz-Fulton, & Norman, 1986).

Table 1

BRIEF DESCRIPTION OF BEHAVIOURS STUDIED

Wandering Behaviours

1. Absconding* (three levels of inappropriate departures were used):
    i. from rooms/activities--absconding from a room or activity to which the participant is unofficially confined;
    ii. from the floor of the nursing home--absconding from the top floor to a lower one;
    iii. from the institution itself.
2. Restless locomotion--locomotion that repeatedly covers the same ground, that is, locomotion with no obvious purpose and no apparent

destination.

3. Group walking--locomotion with one or more demented residents, keeping either in physical contact with one of them or less than arms' length from one of them.

4. Fiddling--restless movements and restless body adjustments that are not components of locomotion. They include stereotypic behaviours, such as table-rubbing, cloth-picking and hem-rolling, as well as, inappropriate handling of things such as fiddling with objects, gathering objects and rummaging through objects.

5. Being lost and/or having navigational difficulties--display of behaviour indicating the participant is briefly disoriented to location, usually evidenced by a hesitation in locomotion (typically at a choicepoint on a route) accompanied by visual scanning of the environment.

6. Searching--looking for objects and goal-directed inquiry for unattainable goals (i.e., goals such as a deceased relative or a childhood home).

7. Trespassing--unauthorized entry into other individuals' private territory.

Other Behaviours

8. Care Given--another person carries out a basic functional behaviour for the participant, for example, feeds, toilets, bathes, grooms, or dresses the participant.

9. Focal Activities--actions which require some measure of attention and concentration, for example, self-care behaviours (such as eating and dressing) and recreational activities (looking at magazines or

participating in a cooking class).

10. Inactive--sitting or standing with no obvious activity, sleeping or dozing.

11. Purposive walking--has an obvious purpose and an apparent destination, that is, directed locomotion, whether the direction is provided by a person accompanying the participant, or whether it is inferred because the participant goes directly to a location and remains there for some period of time.

12. Social Activities--initiating or continuing social contact with another person (whether demented or not), whether the act has negative or positive connotations and whether it involves talking, gesturing or listening (in the latter case some evidence of attentiveness is required).

13. Unusual--*demented* behaviours, that is, behaviours that demonstrate the participant is experiencing a hallucination or delusion, or mimicry or echolalic utterances, or a behaviour that is blatantly inappropriate (urinating or defecating on the floor).

14. Unobservable--the participant or a companion of the participant (family member, medical staff, etc.) has sought privacy, typically, by closing a door. Participants were normally coded "unobservable" in their lavatories, the bathing/tub room, and on some occasions in their bedrooms (e.g., during medical procedures, private family visits, and throughout participants dressing and undressing).

Notes: Full definitions are found in Appendix A.

*Different absconding levels were used because leaving certain areas has very different implications for the demented person's safety.

The wandering behaviours were fully defined so that they could be reliably distinguished and when combined with other behaviours of the coding scheme they formed an exhaustive list of activities. This meant only one code could be associated with a particular event (mutually exclusive) and there was some code for every event (exhaustive).

This study was undertaken to determine to what extent wandering behaviours were manifested by 10 nursing home residents diagnosed with SDAT and to describe and analyze the patterns, if any, evident in their wandering behaviours. The study employed chi-square partitioning to differentiate subgroups of participants who engage in similar amounts of wandering behaviours, then contrasts and comparisons were made between the subgroups.

Lag sequential analysis is used to interpret how the behaviours of interest are sequenced. This analytical technique enables statistical evaluation of the sequencing of behaviours and thus reveals significant patterns in behavioural transitions (ELAG program, Bakeman, 1983; cf. Sackett, 1978). When the technique is used with systematic observations for an event analysis, as it is in the present research, the analysis provides a means of understanding behaviour as a sequence of relatively discrete events and it analyzes how behaviours function on an event-by-event basis. The analysis makes it possible to calculate the probability that any given behaviour will evolve into another behaviour, or with what probability a given behaviour will precede another. Either can be calculated for one lag or many lags, a lag being defined as an event step between sequential events (time units could be used and a moment-by-moment analysis could be done). The basic calculation is a transitional probability. "Transitional probabilities 'correct' for differences in base rates for a given behavioural state," and therefore reveal how commonly one behaviour occurred after another or preceded another (Bakeman & Gottman, 1986, p. 147). A transitional probability is a conditional probability in which the target and given events occur at different times. For example, when the data are event sequences, the transitional probability is the probability, given event *A*, of the target event *B* occurring immediately after (lag 1), occurring after an intervening event (lag 2), etc. The statistic used to measure the significance of the transitional probability is a *Z* statistic (Allison & Liker, 1982).

Method

Subjects

The participants were 10 residents of a nursing home who were all diagnosed by the same medical team at the Edmonton General Hospital's psychogeriatric wing as having SDAT (mid-stage, NINCDS-ADRDA criteria, McKann et al., 1984). No attempt was made before observations began to distinguish wanderers from nonwanderers (the term *wanderer* designates a person who exhibits the various wandering behaviours defined in Appendix A). It was anticipated that as many as half of the participants could be wanderers, based on the results of a study of 400 outpatients diagnosed with SDAT that found 22% of those with moderate dementia, and 50% of those with severe dementia, engaged in excessive pacing and wandering (Teri, Larson, & Reifler, 1988; no definitions were given).

All of the participants lived in a wing located on the second (top) floor of the nursing home. The top floor was chosen for a special dementia unit because of the fear that these residents would abscond. Some had been transferred because of a history of absconding from nursing homes with an easier access to unfenced grounds. In this home no formal strategies were used to curtail absconding except that an office at the front door posted photos to assist in recognizing persons who were to be escorted outside.

All but one of the SDAT patients were female. Mean age was 75.6 years with a range of 65-85. Although 5 of the 10 participants had prescriptions for antipsychotic drugs and 2 others received either an antidepressant or an antianxiety agent, each prescription was judged by a pharmacist to be within the normal range (cf. Appendix B, Medications Taken by SDAT Residents). Thus drug-induced akathisia was not expected to be evident in any of the participants although the behavioural consequences of combining prescriptions is unknown. Informed consent for the participation in the study was obtained from guardians and personal physicians as well as the nursing home administration.

Procedures

Data collection. Pilot work to prepare an mutually exclusive and exhaustive behavioural coding scheme and to train four observers, required two months. The coding scheme was an abbreviated list of the inventory of specific behaviours exhibited by elderly demented persons (Appendix C). It contained a wide range of behaviours including several types of locomotion, social acts, inactivity and focal behaviours such as eating and self-care. The full definitions of behaviours in the coding scheme used to gather the data are provided in Appendix D. Locations, as well as the behaviours in the coding scheme, were translated into unique codes so that they could be rapidly entered into a portable computer (Epson Geneva).

The data were collected on 30 days, during July and August, immediately after the pilot work. Fifty 10-minutes observations, five per participant, were obtained for each hour of the day between 9 AM and 9 PM. This provided 600 observations in total. The 10 participants were observed in a semi-random order, that is, the choice of subject was determined by a randomizing procedure, but two successive observations never focused on the same participant. Interobserver-reliabilities were checked twice daily. Coders were quizzed several times weekly by each other to inhibit drift.

Focal observations were obtained through sampling each individual participant's behaviour in a systematic way. The method of recording was continuous real time measurement, that is, observers kept a running tabulation of individual SDAT residents' behaviours at all the locations that they frequented within the institution. Table 1 (cf. Item 14) has some occasions and places when the participant was considered unobservable. When participants, their caregivers, or their visitors sought privacy behind closed doors (i.e., in their bedrooms, toilets or bathrooms) the observers noted the nature of the event, recorded that close observation was not possible and waited until either the 10 minute observation period had elapsed or the participants reappeared and close observation could resume. Observations that contained substantial periods (more than 3.2 minutes) during which the participant was unobservable were not used in the analyses, thus participants were unobservable only 0.6% of the total time used in the analysis (or 0.3% of the total number of events). However, omitting observations with long periods of "unobservable" time resulted in deletion of much of the caregiving behaviours performed by staff such as toileting and dressing. To prevent further omissions of caregiving behaviours, the time periods in the data set during which caregivers were known to be toileting or bathing participants were recoded as "care given".

Recoding. Observational data collected using a particular behavioural coding scheme are frequently transformed in various ways for various analyses (Bakeman & Gottman, 1986; Hartup, 1979; Sackett, 1979). Sackett (1979) advises that recoding is essential for data collected with hierarchical schemes, such as the one used for this study (Appendix C), if true duration and frequency measures are desired and if lag sequential analyses are used. A coding system that imposes priorities as to whether or not specific behaviours are to be recorded when several occur concurrently produces frequencies for low priority behaviours that are different than they would be if placed higher in the hierarchy or if they were coded in the absence of a coding scheme (Jones, 1973).

The coding rules for the hierarchical scheme that was used to collect data in the present study gave the highest priority to unusual behaviours, to be certain that none were missed. The second priority was social behaviours, which were expected to be both subtle and infrequent and, therefore, easy to overlook. The active behaviours, including various forms of locomotion, had third priority, and inactive behaviours were last. The scheme, however, provided redundant coding of locomotion and it was this redundancy that allowed locomotive behaviours to be recoded. Offset and onset times were available through a comparison of the changes in location, recorded on the location dimension, and the locomotion activities that were independently recorded in the activities dimension.

Forms of locomotion, and related behaviours, that were in the original coding scheme were recoded into the active wandering behaviours (i.e., the various levels of absconding, navigational difficulties, restless locomotion, searching, trespassing and group walking). Fiddling behaviour was primarily derived from three of the unusual behaviours. Additionally, a number of other specific behaviours, such as various forms of social behaviours, were combined into more molar categories. The recoding process is discussed in Appendix E. When there was evidence that locomotion had occurred concurrently with other activities, new behaviour categories were established for these combined occurrences, as advised by Sackett (1979). However, these combined occurrences accounted for a very small proportion of total time. Unusual behaviours were rarely combined with locomotion (only 1.12% of the total time in the study), very likely because several of the unusual behaviours were the basis of fiddling, one of the wandering behaviours. The other type of behaviour given priority to locomotion was social activity. It was found that the amount of time spend in locomotion combined with social activity was only 3.76% of the total time in the study. The wastebasket categories frequently used in coding schemes often account for larger percentages of time than this (Sackett, 1979), and the addition of 27 new behavioural categories in the lag sequential analyses would make the analyses unwieldy, therefore, the combined occurrences were subsumed under the appropriate major category classifications (see Sackett, 1987 for similar collapsing of categories to prioritize particular behaviours).

The basic unit for recoding was the event and the recoding was done at the level of the raw data (i.e., the original computer files after corrections for miscoding errors had been made, cf. Appendix E). The data, as originally coded, had five relatively independent dimensions: time-of-day, location, activity, types of discourse, and types of awareness (Appendix C). The latter four dimensions were time based, that is, the duration the participant spent in each location, at each activity, in each utterance, and at each level of awareness was a component of the data.

In this study restless locomotion as defined in Appendix A, could not have been obtained without recoding. During pilot observations it became evident that aimless wandering could not be distinguished from ordinary walking until the subject had made repeated trips, or some subsequent revelation indicated that the trip had no particular purpose. The purpose of a trip is difficult to discern at the start of a trip unless people express their intentions and SDAT participants seldom proclaim their intentions. Decisions about whether a trip had purpose, or did not, could have been made by the observer at the end of each individual coding session, however, the recoding was done *post hoc* for two reasons. Immediate revision of the data was not possible because it was stored on tape and observers did not have the skills to edit it during collection procedures. Moreover the definitions of wandering behaviours were not finalized until after the data were collected because they were not required for the original coding scheme. However, *post hoc* recoding meant that the observers were blind to the definitions throughout the data collection phase and thus a bias toward an over-representation of restless locomotion could not develop at that stage (Hollenbeck, 1978).

Reliability. The interobserver reliabilities were: .96 for the coding of locations and .73 for the original coding of activities (Kappa statistic, Cohen, 1960). Only location and recoded activity dimensions were analyzed for the present study. The activities dimension was recoded as discussed above. To obtain an intraobserver reliability statistic for the recoding procedure the researcher recoded 10% of the original observations twice, approximately one week apart. Thus two independent judgements were made about the changes that would be appropriate in light of the definitions of the wandering activities. The *intraobserver* reliability was .90 for the recoded activities (Kappa statistic, Cohen, 1960).

Results

Three distinct groups of participants were differentiated by the chi-square partitioning of the observational data. Subsequent analyses permit comparisons and contrasts to be drawn between these three groups that differed in the extent to which they engaged in most of the wandering behaviours. The lag sequential analyses, used to provide a detailed interpretation of the patterns of behaviour and the interactions between behaviours, revealed further differences between the groups as well as some similarities. The unit of analysis in all cases was the behavioural event, not the individual participant, although the event was associated with a particular participant. The events were discrete states in continuous time (of a 10 minute observation). Although there were only 10 participants there were 8215 events coded, thus even though the rarest of these events occurred only 5 times and the next rarest only 10 times, there was sufficient data collected to assign probability values to binomial-test *Z*-scores. Only 1530 two-event sequences would have been required according to Bakeman and Gottman's formula for determining how many data points are required (Bakeman & Gottman, 1986).

Chi-square Partitioning

The homogeneity of the participant group, with respect to the extent to which participants engaged in wandering behaviours compared to other behaviours, was determined through chi-square partitioning. Contingency tables can be decomposed, in a manner analogous to the partitioning of sums of squares in ANOVA, to obtain a better understanding of the relationship between variables than one can obtain from an overall chi-square alone. If some of the components are nonsignificant then the decomposition can be particularly useful for finding where the major relationships are located within the subsets of the categories of the variables (Bishop, Fienberg, & Holland, 1975; Iverson, 1978).

The maximum likelihood-ratio chi-square (G^2) is typically used for partitioning because it has important properties that Pearson chi-square does not possess: G^2 is the statistic that is minimized by maximum likelihood estimates and it can conveniently be broken into parts, either conditionally or structurally. However, the Pearson, as well as the MLR chi-squares, are reported for the analyses to demonstrate that the decisions would not be altered by using the more familiar statistic. Although the chi-square distribution requires that the events be independent of each other, Bakeman and Gottman (1986 point out that this is not an problem, rather it is the question one seeks to answer. In the sequential analysis of data one wants to detect *dependence* in the observations, therefore observed frequencies are compared with those one would expect if the observations were independent (Appendix F reports the correlations between the wandering behaviours).

The overall chi-square indicated significant differences between the participants involvement in wandering behaviours in contrast to nonwandering behaviours (X^2 632.96, G^2 648.08, *df* 9, $p<.001$; Wilkinson, 1987). The odds ratios, expressing the frequency of wandering events to nonwandering events, were examined to decide on the strategy for decomposing chi-square (Table 2). Odds ratios are measures of association, commonly used to express the probabilities of two mutually exclusive events. Their formal connection with probabilities is, "If the probability of an event is *p*, then the odds in favor of the event are *p* to (1-*p*)" (Hays, 1981, p. 28).

Table 2 represents the basic contingency table, showing the number of events of wandering and nonwandering behaviours for each participant. Row totals are replaced by odds ratios (participants are listed in descending order of their odds ratios). The odds ratios suggested three groups: two participants engaged in nearly equivalent amounts of the two classes of behaviour, for two others wandering behaviours were comparatively infrequent, and the ratios for the remaining six participants ranged between these two extremes.

Table 2

ODDS RATIOS: WANDERING BEHAVIOURS TO ALL OTHER ACTIVITIES

	Frequencies		
Participant	Wandering Behaviours	Nonwandering Behaviours	Odds Ratio
P	371	326	1.16
S	281	318	0.88
E	265	567	0.47
T	246	520	0.47
M	284	699	0.41
G	235	664	0.35
H	215	681	0.32
N	186	648	0.29
L	50	437	0.11
I	126	1096	0.11
Total	2259	5956	0.46

Table 3 displays the partitioning of the overall chi-square through a series of orthogonal contrasts. When participants were placed in the three groups suggested by the odds ratios, most of the effect was explained (the comparison of participants L and I with all others produced G^2 371.54, *df* 1, $p<.001$ and the comparison of participants P and S with the remaining six produced G^2 236.54, *df* 1, $p<.001$). There was still a small effect unexplained in the group of six participants. A contrast between participants H and N and the four others explained almost all the remaining effect (G^2 24.34, *df* 1, $p<.001$). The other contrasts in Table 3 demonstrate there were no substantial differences between various participants.

Table 3

LIKELIHOOD RATIO CHI SQUARE PARTITIONING OF ACTIVITIES

Orthogonal Contrast	X^2	G^2	*df*	Signif.
L & I vs. all others	320.21	371.54	1	.000
L vs. I	0.00	0.00	1	.979
P & S vs. six others (i.e., G, H, M, E, N & T)	248.79	236.54	1	.000
P vs. S	5.14	5.14	1	.023
H & N vs. G, M, E & T	23.90	24.34	1	.000
H vs. N	0.70	0.70	1	.404
G vs. M vs. E vs. T	9.75	9.81	3	.020
Total G^2		648.08*	9	.000

Note: *Rounding error results in the sum of the individual chi-squares being .01 less than the total.

Because the chi-square partitioning indicated there were three substantially different groups, the event based probabilities (relative frequencies) and the lag sequential analyses that follow are based on a division of the participants into three major groups. Two participants with approximately a one-to-one ratio of wandering behaviours to other behaviours of were termed *excessive wanderers*. Six participants with a ratio of approximately two wandering behaviours to every five other behaviours were termed *moderate* *wanderers*. Two participants with a one-to-nine ratio of wandering behaviours to other behaviours were classified as *nonwanderers*.

Event based probabilities

Event based vs. time based measurement. A comment is in order at this point on time based, sequential data vs. event based, sequential data. Because the chi-square partitioning reported immediately above use *event frequencies* and lag sequential analyses that follow use *event based conditional probabilities*, most of the simple probabilities that are reported are also *event based*. The choice of event based statistics stems from the primary concern in the present study with the relationships between behavioural events rather than their temporal aspects. Hartup (1979) finds that frequencies, and rate measures derived from them, have dominated the observational literature. Although duration based lag sequential analyses are possible, Bakeman and Dabbs (1976) report that they are subject to artifactual sequential dependence when the time-sequence data have small time intervals and the subjects exhibit some inertia. Because the data in the present study have both these qualities, time based lag sequential analyses were not used.

Attention is drawn to the fact that the simple probabilities are event based because they should not be confused with time based probabilities. People commonly think about probabilities and percents in relation to time. *Event based probabilities*, however, are relative frequencies, calculated by dividing each individual frequency by the total number of behaviour changes (i.e. total number of events coded). Time budgets cannot be obtained from event based probabilities. *Time based probabilities* are calculated by dividing the total duration for each type of behaviour by the total observation time in the study. They measure the chances of seeing a particular behaviour at any randomly chosen moment of the day. Event probabilities tell the proportion of occurrences within the total number of behaviour changes for each participants and therefore, represent a profile of behaviour that is independent of the total amount of behaviour emitted (Sackett, 1978).

Event based conditional probabilities are extensively used in medical applications of probability theory where they are termed *specific rates* (Fleiss, 1981). Comparisons are made across ages, races, sexes, occupations, and so on, of conditional probabilities of defined characteristics (i.e. the probability that a randomly selected individual has characteristic A, conditional on his/her having characteristic B). Use of these rates reflects strong assumptions that relative frequencies indicate the activity of a behavioural system. Similar assumptions are made across scientific disciplines. Hartup (1979, p. 15) makes the point that "rate of occurrence is widely believed to be correlated with the strength of the internal response disposition or the frequency of prior reinforcement--i.e., the measure is theoretically relevant....Duration and density measures are used infrequently because they are not clearly linked to any theory of social action."

Although Bakeman and Gottman (1986) suggest that both event probabilities and time based probabilities are valid and useful measures, observational manuals are nearly silent on the consequences of choosing one type of probability over the other. However, the two measures have different qualities. A basic premise in behavioural research is that observers will devote the same amount of time to all participants, therefore, time based probabilities will all have the same divisor. The divisor in event based probabilities (relative frequencies) is free to vary with the animation of the participant and with the number of codes in the coding scheme. The divisors for such probabilities are apt to be quite different across participants and across coding schemes. Although this makes relative frequencies sensitive to individual variability when comparisons are made within a study, relative frequencies are also sensitive to the number of behaviours in a coding scheme. This is problematic because only rarely are coding schemes used by more than one group of researchers; they tend to vary with the research questions (Bakeman & Gottman, 1986) and can be a major source of interstudy variability.

It should be recognized that relative frequencies are interdependent and they should be interpreted in reference to other scores in the set (Jones, 1973). In order to illustrate the dependency among sets of relative frequencies one can delete a behaviour category and examine the effect on the proportion scores for the remaining categories. For example, if one behaviour is dropped from a multicode data set after observations have been collected then, when the proportion scores are recalculated using the lowered total behaviour frequency, the revised proportion scores will differ from the original scores by varying amounts depending on individual subject differences in the frequency of the deleted category. Or, suppose a category is simply not observed, that is, a coding scheme is used that differs from the original scheme by only one category. "Compared with observation including all categories, the total of all behaviours observed may differ, and therefore the proportion scores based on the total codes will differ" (Jones, 1973, p. 137).

Therefore, the number of units of behaviour in the coding scheme can influence the event based probabilities and the results of a study. Why this is not discussed fully in articles advocating lag sequential analysis is puzzling, but may be attributed to the comparatively recent development of the methodology (Sackett, 1978). Bakeman and his coworkers (Bakeman & Dabbs, 1976; Bakeman & Gottman, 1976) emphasize that time based analyses are not inherently better than event based analyses and the researcher needs to shift from one type to the other depending upon the question at hand. This was done in the present study in reporting probabilities. The simple probabilities discussed in the next section are *event based* because they are the best accompaniment to the lag sequential analysis, but *time based* probabilities are also discussed in a later table (before the concluding discussion). They were included because the proportion of time devoted to particular behaviours is useful in comparing some of the results of the present study with other studies that provide quantitative data on wandering. Time based probabilities also allow comparison of the two methods of observation in the dissertation: the focal observations, using continuous data recording, in the present study and the instantaneous scans used in Study 4 (cf. Appendix G).

The time based probabilities in the present study appear very similar to the event based probabilities discussed next. This occurs because with a mutually exclusive and exhaustive coding scheme "the frequency scores themselves permit certain implications concerning behavioural durations even if durations were not actually measured in the study" (Sackett, 1978, p. 32). Sackett gives as an example a resident (1) who has very few behaviour changes in a 300-second interval in contrast to other residents observed and another resident (2) who has the most behaviour changes. The behaviours of resident 1, therefore, must be of longer average duration than the other residents and resident 2 will have the shortest average behaviour durations. Measuring durations may provide new information. For example, if residents 1 and 2 have the same frequencies of social behaviour while the durations were 9 vs. 150 seconds, a 16.7-fold difference, it becomes evident that frequency and duration measures can carry quite different behavioural information which is differentially sensitive in detecting differences in individuals. Notarius, Krokoff, and Markman (1981) have suggested, however, that questions like "what if anything is different about X?" (for X substitute some codable behaviour) are most apt to be answered by rates or proportions relevant to other behaviour.

Event based probabilities. Figure 1 shows the simple event based probability of each type of behaviour for the three groups of wanderers and the nonwanderers. The utility of the measure is illustrated when focal acts of the excessive wanderers and nonwanderers are compared. Although the occurrences of inactivity for the two excessive wanderers (331) were half that for the two nonwanderers (669), the event probability was .26 for the excessive wanderers and .39 for the nonwanderers.

Figure 1. The event based probabilities, for three groups of participants, excessive wanderers, moderate wanderers, and nonwanderers, for the seven types of wandering behaviours (searching, trespassing, absconding, group walking, navigational difficulty, restless locomotion and fiddling), as well as, focal activities, social activities, inactivity, and other miscellaneous behaviours. These probabilities are based on focal observations of SDAT participants.

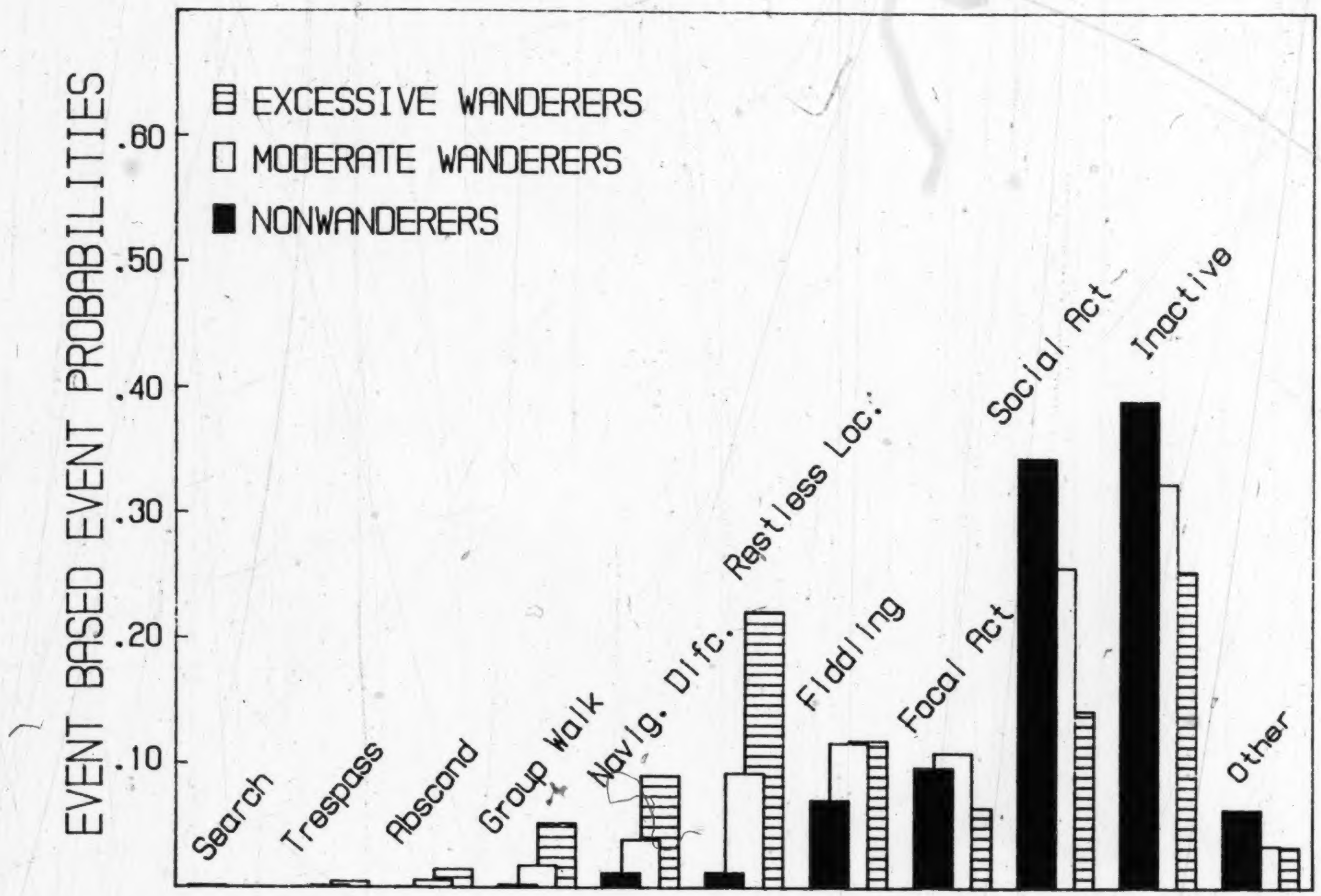

EVENT BASED EVENT PROBABILITIES
.60
.50
.40
.30
.20
.10
▤ EXCESSIVE WANDERERS
☐ MODERATE WANDERERS
■ NONWANDERERS
Search
Trespass
Abscond
Group Walk
Navig. Difc.
Restless Loc.
Fiddling
Focal Act
Social Act
Inactive
Other

Figure 1.

The wandering behaviours of absconding, trespassing, searching, group walking, having navigational difficulty, restless locomotion, and fiddling had a aggregate event-based probability of .500 for excessive wanderers, .280 for moderate wanderers and .100 for nonwanderers. However, absconding and trespassing, the wandering behaviours that are most apt to expose a resident to danger, had an event based probability of only .020 for excessive wanderers, .008 for moderate wanderers and .002 for nonwanderers. Four participants were involved in the seven incidents of trespassing and in one incident a nonwanderer trespassed. When each level of absconding was considered separately, each event-based probability was very small. Absconding from the floor was .002 for excessive wanderers, .001 for moderate wanderers, and .000 for nonwanderers. The probabilities for absconding from a room or activity were .013 for excessive wanderers, .005 for moderate wanderers, and .001 for nonwanderers. No absconding from the nursing home occurred during direct observations.

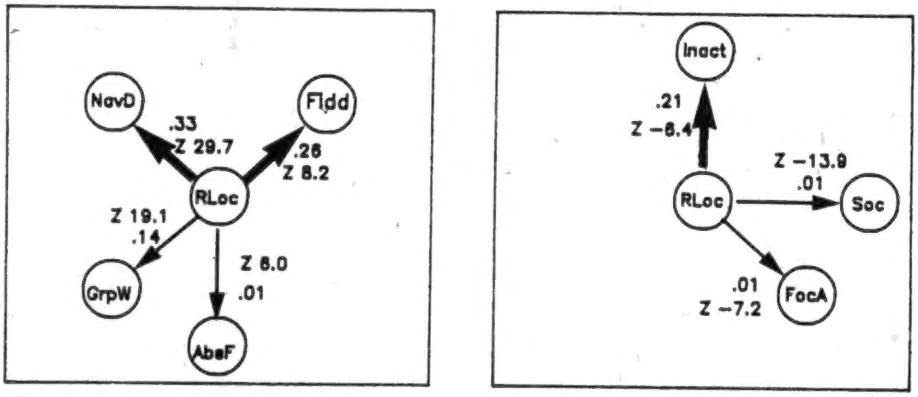
The major behavioural difference in the three groups, other than in the extent of their wandering behaviours, was in their social activity and inactivity. The event probability of social activity for excessive wanderers was considerably lower (.143) than the moderate wanderers' (.257), which was in turn lower than that of nonwanderers' (.345). The probability of inactivity is highest for the nonwanderers (.391) with moderate wanderers next highest (.325) and excessive wanderers lowest (.255).

Lag Sequential Analyses

Event based probabilities establish the relative frequency of any type of event in a group's or an individual's behavioural repertoire, putting the wandering behaviours in perspective. They reveal nothing, however, about the possibility of a dangerous behaviour, such as absconding from the nursing home, arising from another behaviour. Lag sequential analysis can provide this information by describing and statistically evaluating the sequencing of behaviours (ELAG program, Bakeman, 1983; cf. Sackett, 1978). The form of the data for an event based lag sequential analysis is very simple; each line of a data file consists simply of codes for various events or states ordered as they occurred in time (an event was defined as any continuous interval coded in the same way). As an example of the analysis, consider the moderate wanderers' restless locomotion and the behaviours that followed it an a event-by-event basis.

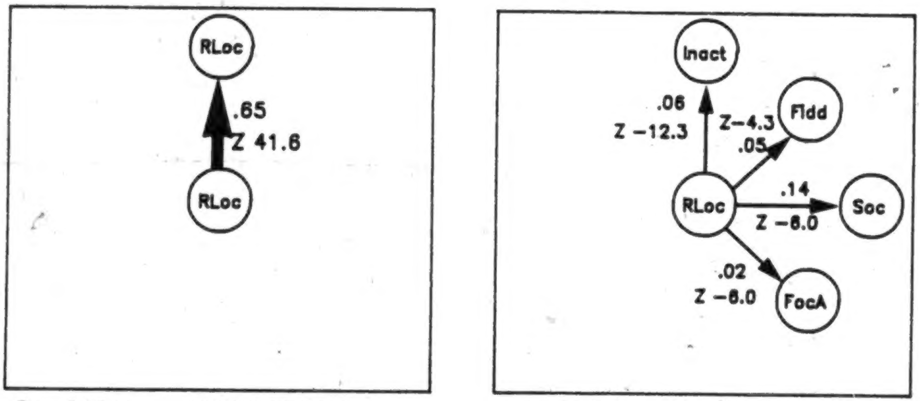
Restless locomotion of wanderers. In Figure 2, the central circle is restless locomotion at lag 0 and the behaviours that follow it at various lags after the criterion instance are arrayed around it. Through the succession of diagrams (Figure 2a-2r) the centre circle is always restless locomotion at lag 0, although the behaviours that encircle it are one lag further from the criterion, with every row, as one views down the rows of the figure. Behaviours are included only if their transitional probabilities were significantly different than statistically expected (i.e., *Z*-scores $\geq +3.08$, using Bonferroni's correction to obtain a study-wise alpha of .05; Bakeman & Gottman, 1986).

Figure 2a-r. The behaviours of moderate wanderers that follow restless locomotion significantly more than statistically expected (on the left side of the page) and significantly less than statistically expected (on the right side). The abbreviations and the behaviours they represent are: AbsF, absconding from the floor; Fidd, fiddling; FocA, focal acts; GrpW, group walking; Inact, inactive; NavD, navigational difficulty; Rloc, restless locomotion; Soc, social activities; Tres, trespassing.


NavD
Fldd
.33
Z 29.7
.26
Z 6.2
RLoc
Z 19.1
.14
GrpW
Z 6.0
.01
AbsF
Inact
.21
Z −6.4
Z −13.9
.01
RLoc
Soc
.01
Z −7.2
FocA

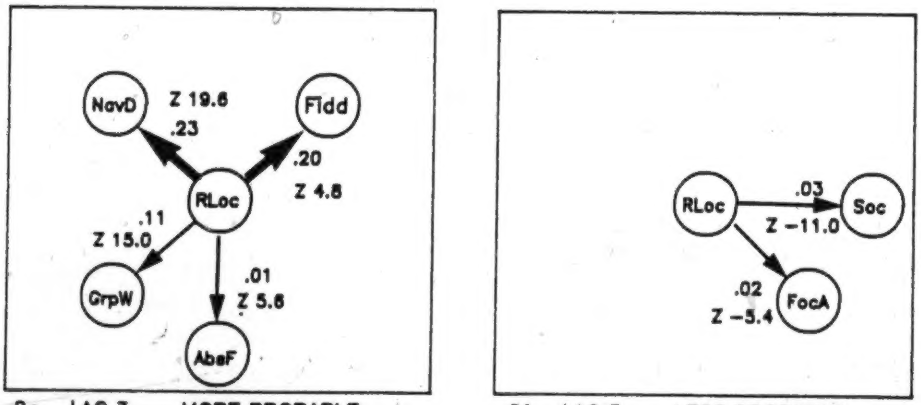
2a. LAG 1 -- MORE PROBABLE

2b. LAG 1 -- LESS PROBABLE


RLoc
.65
Z 41.6
RLoc
Inact
.06
Z −12.3
Z−4.3
.05
Fldd
RLoc
.14
Z −6.0
Soc
.02
Z −6.0
FocA

2c. LAG 2 -- MORE PROBABLE

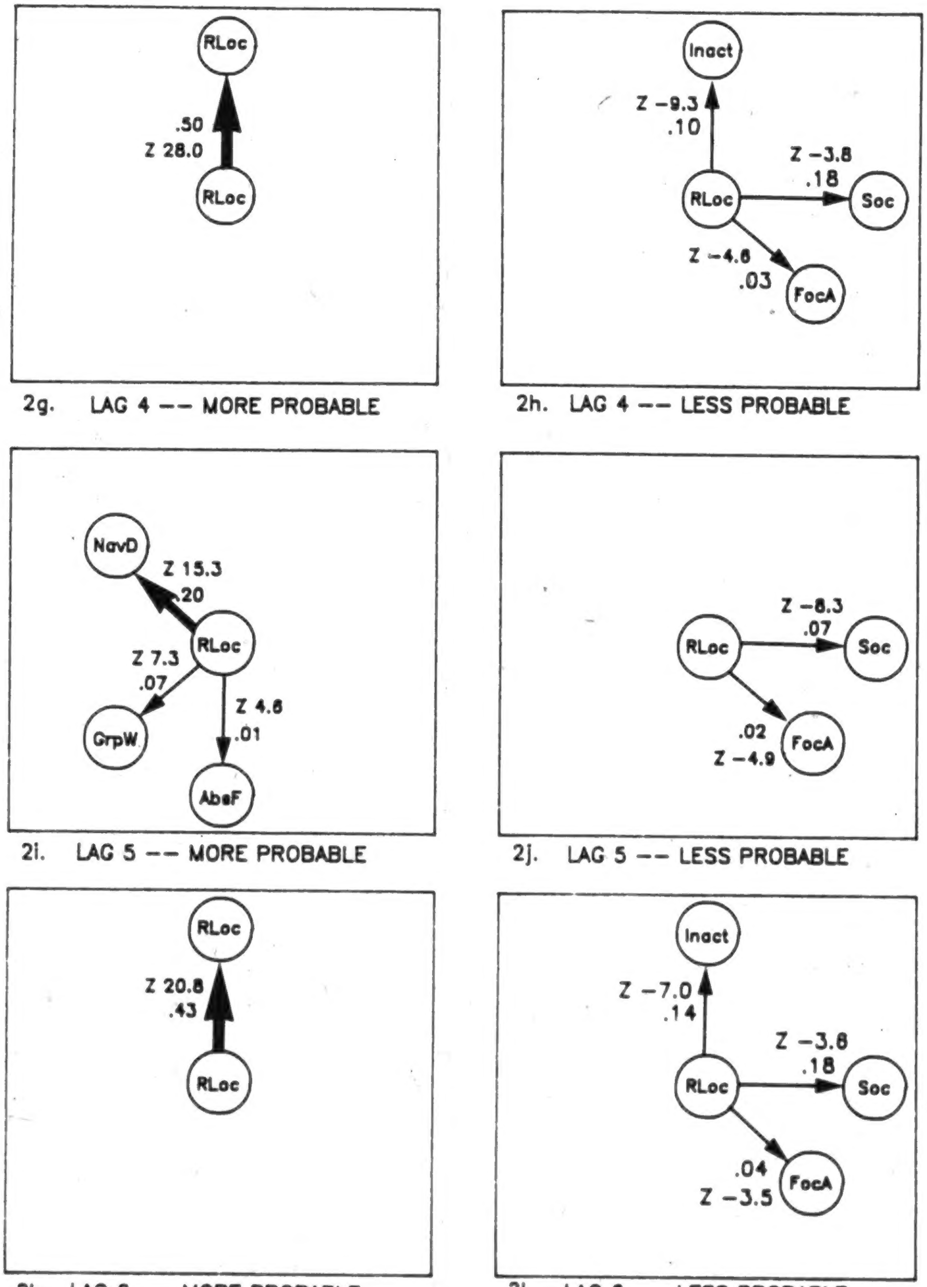
2d. LAG 2 -- LESS PROBABLE


NavD
Z 19.6
.23
Fldd
.20
Z 4.8
RLoc
.11
Z 15.0
GrpW
.01
Z 5.6
AbsF
RLoc
.03
Z −11.0
Soc
.02
Z −5.4
FocA

2e. LAG 3 -- MORE PROBABLE

2f. LAG 3 -- LESS PROBABLE

FIGURE 2 TRANSITIONAL DIAGRAMS FOR MODERATE WANDERERS


RLoc
.50
Z 28.0
RLoc
Inact
Z -9.3
.10
Z -3.8
.18
RLoc
Soc
Z -4.8
.03
FocA
NavD
Z 15.3
.20
RLoc
Z 7.3
.07
Z 4.8
.01
GrpW
AbsF
Z -8.3
.07
RLoc
Soc
.02
Z -4.9
FocA
RLoc
Z 20.8
.43
RLoc
Inact
Z -7.0
.14
Z -3.8
.18
RLoc
Soc
.04
Z -3.5
FocA

2g. LAG 4 -- MORE PROBABLE

2h. LAG 4 -- LESS PROBABLE

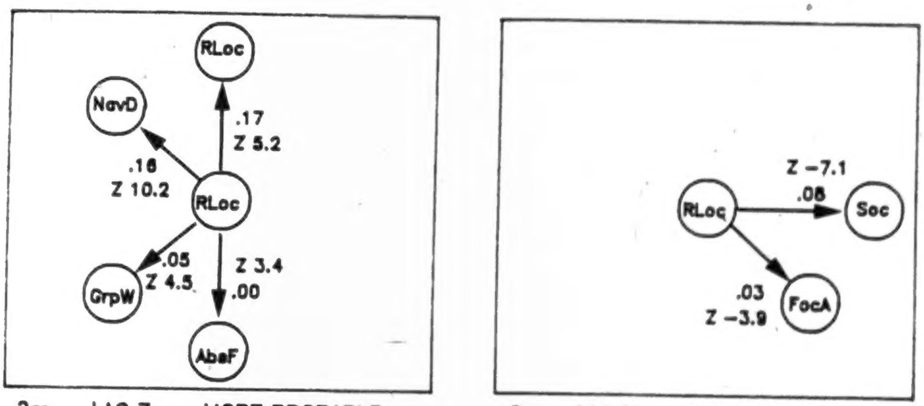
2i. LAG 5 -- MORE PROBABLE

2j. LAG 5 -- LESS PROBABLE

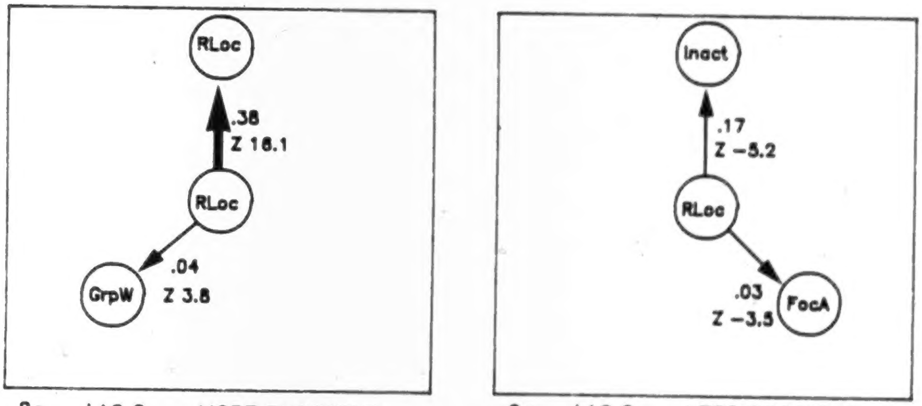
2k. LAG 6 -- MORE PROBABLE

2l. LAG 6 -- LESS PROBABLE

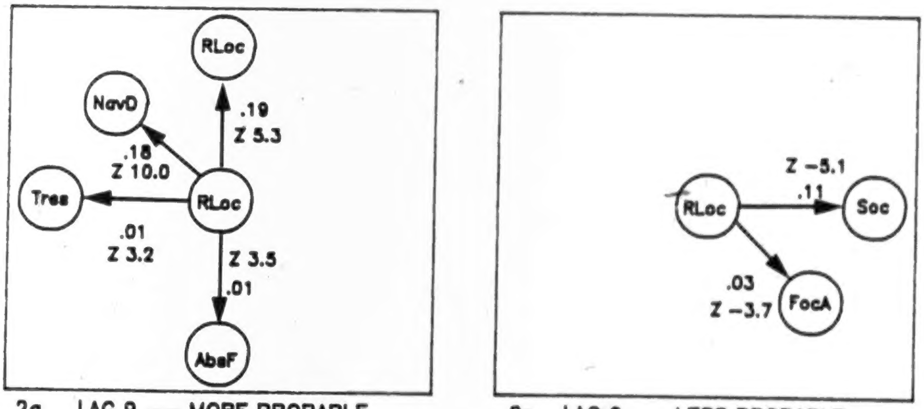
TRANSITIONAL DIAGRAMS FOR MODERATE WANDERERS


RLoc
NavD
.17
Z 5.2
.16
Z 10.2
RLoc
.05
Z 4.5
GrpW
Z 3.4
.00
AbsF
Z -7.1
.08
RLoc
Soc
.03
Z -3.9
FocA

2m. LAG 7 -- MORE PROBABLE 2n. LAG 7 -- LESS PROBABLE


RLoc
.38
Z 16.1
RLoc
.04
GrpW
Z 3.8
Inact
.17
Z -5.2
RLoc
.03
Z -3.5
FocA

2o. LAG 8 -- MORE PROBABLE 2p. LAG 8 -- LESS PROBABLE


RLoc
NavD
.19
Z 5.3
.18
Z 10.0
Tres
RLoc
.01
Z 3.2
Z 3.5
.01
AbsF
Z -5.1
.11
RLoc
Soc
.03
Z -3.7
FocA

2q. LAG 9 -- MORE PROBABLE 2r. LAG 9 -- LESS PROBABLE

TRANSITIONAL DIAGRAMS FOR MODERATE WANDERERS

Both Figure 2a and 2b illustrate the behaviours that occurred at lag 1 for moderate wanderers. Behaviours in 2a had significant positive *Z* scores, indicating that they occurred significantly more often than statistically expected. Behaviours in 2b had significant negative *Z* scores, that is, they occurred significantly less often than expected (expected is used in its statistical sense). Transitional probabilities for each behaviour are given near the directional arrows in 2a and 2b. Notice that inactivity occurred significantly less than expected following restless locomotion, even though the transitional probability is .21 (*Z* -6.41). Moreover, group walking occurred significantly more than expected although its transitional probability was somewhat similar at .14 (*Z* 19.09). However, the baseline or event based probabilities for these behaviours were very different: .33 for inactivity and .02 for group walking. Thus the 59 instances of group walking that occurred at lag 1 are significant whereas the 91 instances of inactivity are not significant.

As stated in the introduction to this study, the transitional probabilities correct for differences in base rates for a given behavioural state and reveal how commonly one behaviour occurred after another (or preceded another). The Z scores associated with the transitional probabilities give a good estimation of the importance of the transition (Bakeman & Gottman, 1986).

From the diagrams for lag 2 in Figure 2c and 2d, it is evident that the second behaviour change, or transition, after restless locomotion had an extremely high probability of being a return to restless locomotion (.65, *Z* 41.58). That is, after a behaviour interrupted the subjects' locomotion, these participants immediately returned to restless locomotion. The behaviour that would have interrupted, or would been performed in the context of the restless locomotion that began at lag 0 would have been one of the behaviours in Figure 2a or 2b. The behaviours that occurred significantly less often than expected (Figure 2d) were much the same as they were at the first lag. Although focal and social activities had relatively high event based probabilities for these participants (Figure 1), the behaviours appear to have been incompatible with restless locomotion, as all of the right hand figures indicate.

Subsequent odd numbered lags look much like lag 1 and subsequent even numbered lags look much like lag 2, thus there were remarkably few changes for a number of lags beyond lags 1 and 2. The main difference between the series of diagrams on the right in Figure 2, is the presence or absence of inactivity. Inactivity occurred less often than expected at lag 1 and on *all* the lags on which restless locomotion had a high probability of following the criterion instance of restless locomotion. The remarkable differences between the series of diagrams on the left side of Figure 2 are derived from three main factors: the type of activity being analyzed, the level at which behaviour is coded, and also, partially, as an artifact of event analysis. (Time based lag sequential analysis also have an artifactual effect; the probability that a state will follow itself is in large part an artifact of the time interval selected in the analysis with shorter intervals producing higher probabilities (Bakeman & Dabbs, 1976).) The level at which behaviour was coded in the present study was somewhere between molar and molecular; if a participant stopped eating and started talking or listening to someone they were coded as being socially engaged and when eating resumed the code changed again. Thus a meal was not coded as a molar event, but as a series of momentary events. The particular event, however, also contributes to the difference between even and odd numbered lags. Eating a meal usually persists through a number of interruptions and continues until a person is satiated or the food is gone. In a similar manner, restless locomotion, as engaged in by the participants, had many other events that occurred within the context of the locomotion, but the locomotion had a relatively high probability of persisting. The analysis for the moderate wanderers indicates that restless locomotion had very high probabilities of persisting.

The artifactual effect that contributes to the difference between even and odd numbered lags stems from the fact that observers could not code two successive events in the same way; if they did the codes would represent just one state not two. This accounts for restless locomotion not being one of the activities that follow the criterion event (restless locomotion) in Figure 2a, *but this does not directly effect any other lag*. It has an indirect effect, however, because of the very high probability that restless locomotion will continue after it is interrupted. Every time restless locomotion resumed, the next act *had to be different* for it to be coded by the observers. For example, using the data illustrated in Figure 2, and using X to represent the group of behaviours that have a high probability of intervening in restless locomotion at odd number lags up to lag 9, the sequence of behaviours that were detected were (starting with the criterion occurrence at lag 0) RLoc, X, RLoc, X, RLoc, X, RLoc, X/RLoc, RLoc/Grwp, and X/RLoc (the abbreviations are those used for restless locomotion and group walking in Figure 2). The fact that restless locomotion occurs at both odd and even numbered lags after lag 6 seems to suggest that, if an "X" behaviour had brought restless locomotion to a halt, it began again in some instances by lag 7 or lag 9. Although subsequent lags are not illustrated in Figure 2 this pattern continues for lags 10, 11 and 12, but not lag 13. After that restless locomotion occurs in significant frequencies at even numbered lags from lag 14 through to lag 20 inclusive (*Z* scores were lag 2, 41.58; lag 4, 27.97; lag 6, 20.80; lag 7, 5.19; lag 8, 16.06; lag 9, 5.32; lag 10 ; 13.24; lag 11, 4.41; lag 12, 10.21; lag 14, 5.72; lag 16, 5.40; lag 18, 7.36; lag 20, 5.09). The events would have varied in length, but this pattern suggests that if the wanderer stopped the restless locomotion (rather performing other acts in the context of the locomotion) during the 10 minute observational session, then there was a good probability the locomotion would begin again and again would continue for a number of lags.

The analyses indicated that navigational difficulty and restless locomotion continued their interactive pattern, occurring at significant frequencies up until lag 21 (*Z* scores were: lag 1, 29.72; lag 3, 19.61; lag 5, 15.30; lag 7, 10.15; lag 9, 10.04; lag 11, 8.15; lag 13, 5.54; lag 15, 5.97; lag 17, 5.47; lag 19, 4.67; lag 21, 3.32). Analyses were done for 36 lags, although when most behaviours were used as the criterion for analyses, they were not followed by other behaviours for that many lags because of the limitations of the 10 minute observation period. The general trend is that as one gets further and further from the criterion behaviour fewer behaviours have significant *Z* scores and the scores are smaller.

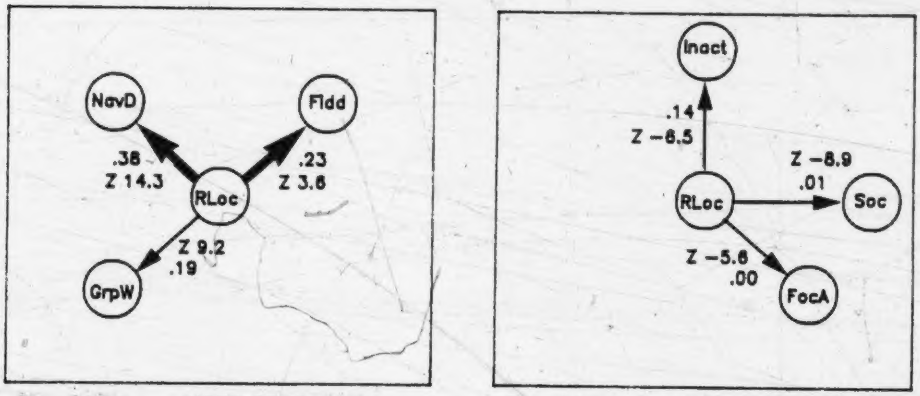
Group walking also occurred systematically in the pattern (appearing at lags 1, 3, 5, 7, 8 and 11 with *Z* scores of 19.09, 15.03, 7.26, 4.47, 3.81 and 4.03, respectively); thus there was a significant probability that the participants could be diverted into walking with a group, although the transitional probabilities were consistently lower for it than for either restless locomotion or navigational difficulty. Analyses confirming the interrelationship of group walking and navigational difficulty with restless locomotion are discussed under the headings for analyses focusing on those behaviours. Fiddling intervened in the early behaviour transitions (lag 1, *Z* 8.21, and lag 3, *Z* 4.79) but did not persist.

The behaviours that were surprising in the pattern were trespassing (lag 9) and absconding from the floor (lags 1, 3, 5, 7 and 9). Neither occurred with much frequency in the data. Trespassing accounted for only 0.2% of behaviour events for the moderate wanderers and absconding from the floor accounted for only 0.1%. Bakeman and Gottman (1986) caution against attaching too much importance to the transitional probabilities when few sequences are observed but suggest that the *Z* scores associated with them are a good measure of their worth because "after all, the *Z* score is a measure of the extent to which a particular transitional probability deviates from its expected value" for the particular subjects (p. 150). The *Z* scores for absconding from the floor were 6.01, 5.55, 4.60, 3.39, and 3.51 at lags 1, 3, 5, 7, and 9 respectively and the score for trespassing at lag 9 was 3.23. None is of borderline significance. However, it is important to check that the transitional probabilities for restless locomotion are significant when both absconding from the floor and trespassing are criterion behaviours for analyses (Bakeman & Gottman, 1986).

Restless locomotion of excessive wanderers. The restless locomotion of excessive wanderers, presented in Figure 3 is remarkably similar to that of moderate wanderers. However, absconding does not play a role in the pattern and the analyses indicated that there is no trend toward significance. Interestingly, the transitional probabilities for a return to restless locomotion are even higher than they were for moderate wanderers (*Z* scores were 23.92, 16.58, 13.22 and 9.59 at lags 2, 4, 6 and 8 respectively). Notice that restless locomotion occurs significantly less than expected at lag 3 and lag 5 (*Z* -6.37 and -3.25, respectively), most likely because of the very high probability that a bout was still continuing at lag 2 and lag 4. Excessive wanderers continued restless locomotion through many interruptions, or viewed in another way, they performed many other behaviours in the context of restless locomotion, in the same manner as the moderate wanderers, although lags beyond lag 9 are not illustrated in Figure 3.

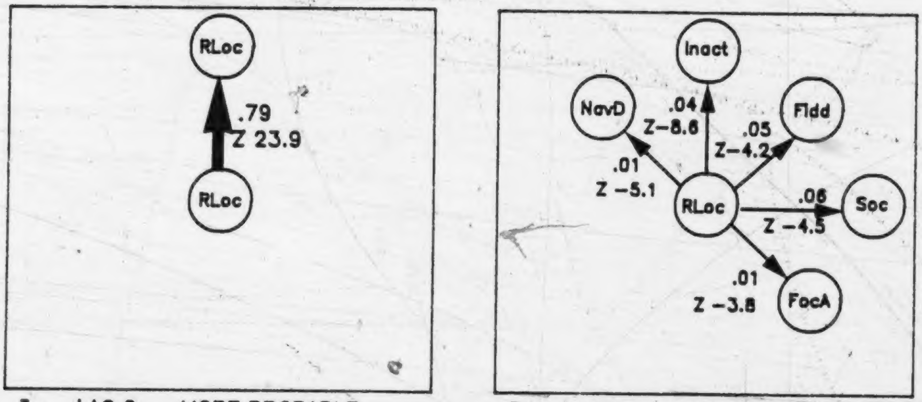
Restless locomotion of nonwanderers. Restless locomotion was infrequent for the nonwanderers, but when it occurred the main difference in the pattern was in the number of transitions. Nonwanderers' restless locomotion did not persist.

Figure 3a-r. The behaviours of excessive wanderers that follow restless locomotion significantly more than statistically expected (on the left side of the page) and significantly less than statistically expected (right side). The abbreviations and the behaviours they represent are: AbsF, absconding from the floor; Fidd, fiddling; FocA, focal acts; GrpW, group walking; Inact, inactive; NavD, navigational difficulty; Rloc, restless locomotion; Soc, social acts; Tres, trespassing; Unob, unobservable.


NavD
Fldd
.38
Z 14.3
RLoc
.23
Z 3.6
Z 9.2
.19
GrpW
Inact
.14
Z -6.5
Z -8.9
.01
RLoc
Soc
Z -5.6
.00
FocA

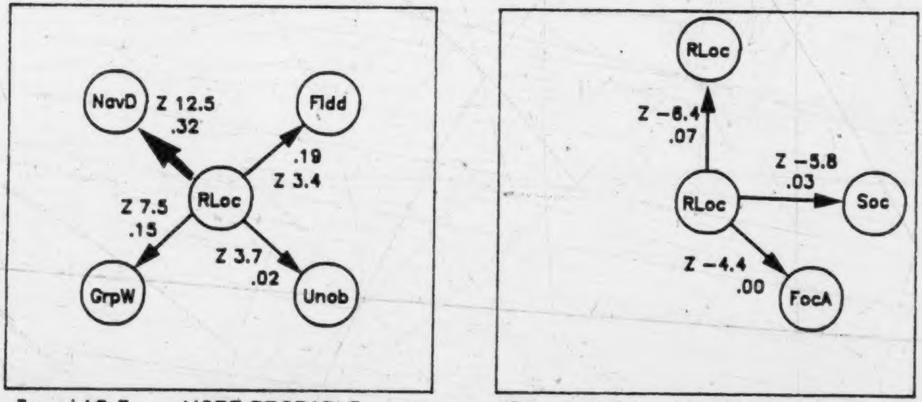
3a. LAG 1 -- MORE PROBABLE

3b. LAG 1 -- LESS PROBABLE


RLoc
.79
Z 23.9
RLoc
Inact
NavD
.04
Z-8.6
Fldd
.05
Z-4.2
.01
Z -5.1
RLoc
.06
Soc
Z -4.5
.01
Z -3.8
FocA

3c. LAG 2 --MORE PROBABLE

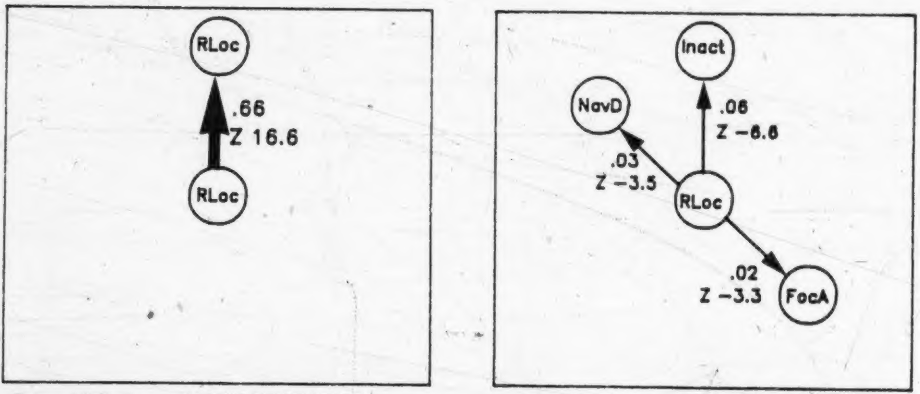
3d. LAG 2 -- LESS PROBABLE


NavD
Z 12.5
.32
Fldd
.19
Z 3.4
Z 7.5
.15
RLoc
Z 3.7
.02
GrpW
Unob
RLoc
Z -6.4
.07
Z -5.8
.03
RLoc
Soc
Z -4.4
.00
FocA

3e. LAG 3 -- MORE PROBABLE

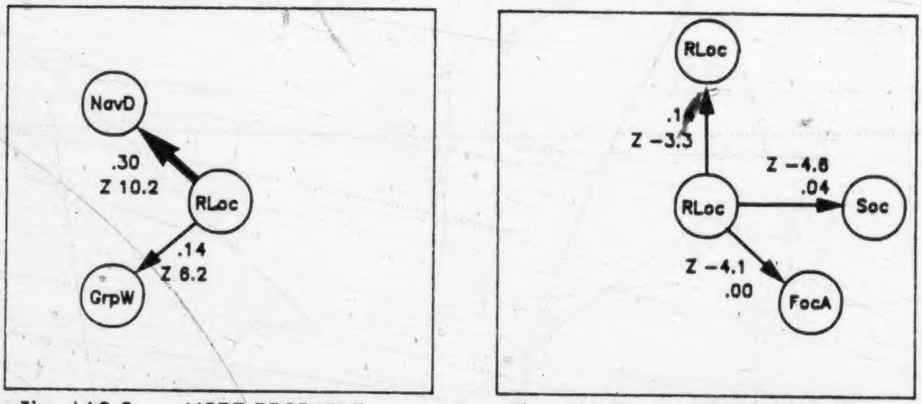
3f. LAG 3 -- LESS PROBABLE

FIGURE 3 TRANSITIONAL DIAGRAMS FOR EXCESSIVE WANDERERS


RLoc
.66
Z 16.6
RLoc
Inact
NavD
.06
Z −6.6
.03
Z −3.5
RLoc
.02
Z −3.3
FocA

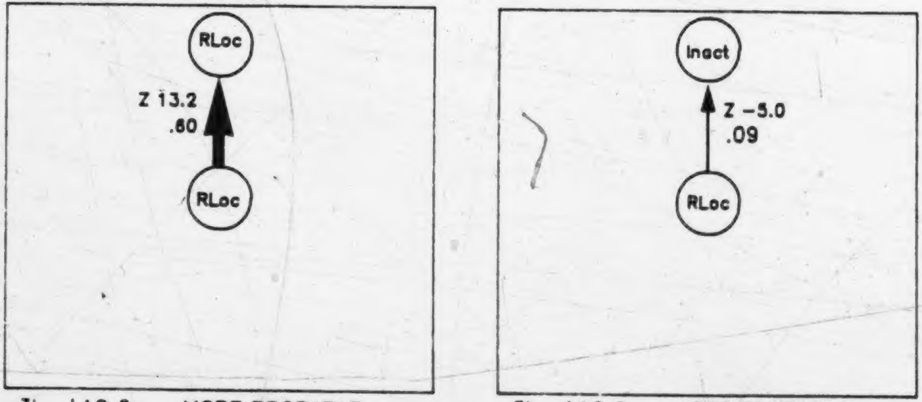
3g. LAG 4 -- MORE PROBABLE

3h. LAG 4 -- LESS PROBABLE


NavD
.30
Z 10.2
RLoc
.14
Z 6.2
GrpW
RLoc
.1
Z −3.3
Z −4.6
.04
RLoc
Soc
Z −4.1
.00
FocA

3i. LAG 5 -- MORE PROBABLE

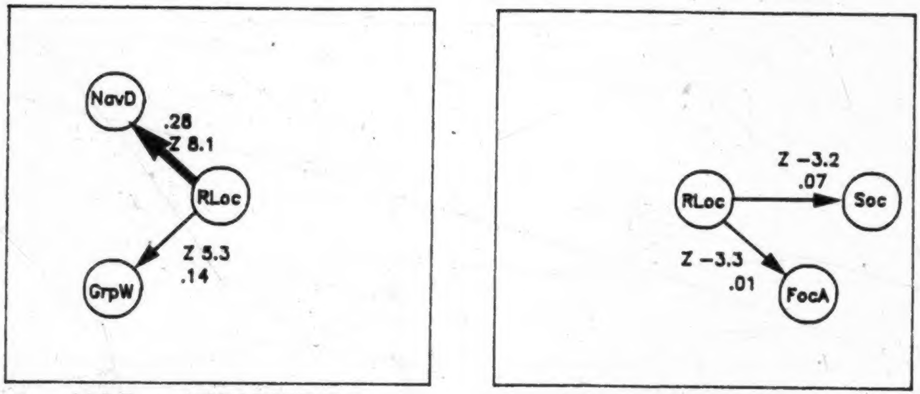
3j. LAG 5 -- LESS PROBABLE


RLoc
Z 13.2
.60
RLoc
Inact
Z −5.0
.09
RLoc

3k. LAG 6 -- MORE PROBABLE

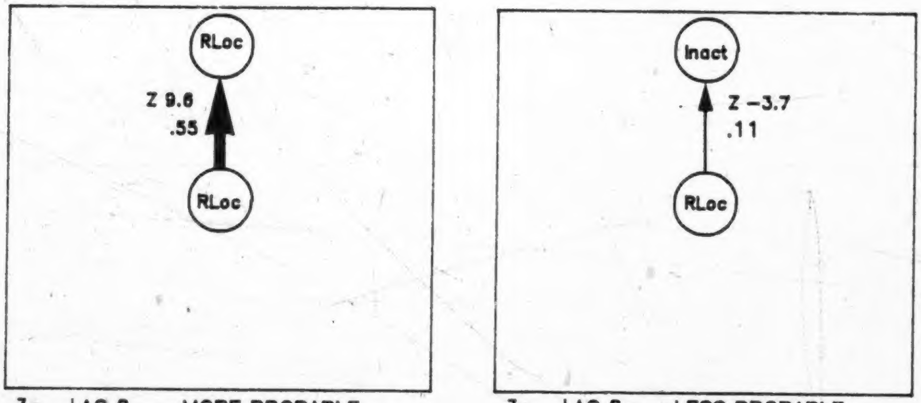
3l. LAG 6 -- LESS PROBABLE

TRANSITIONAL DIAGRAMS FOR EXCESSIVE WANDERERS


NavD
.28
Z 8.1
RLoc
Z 5.3
.14
GrpW
Z −3.2
.07
RLoc
Soc
Z −3.3
.01
FocA

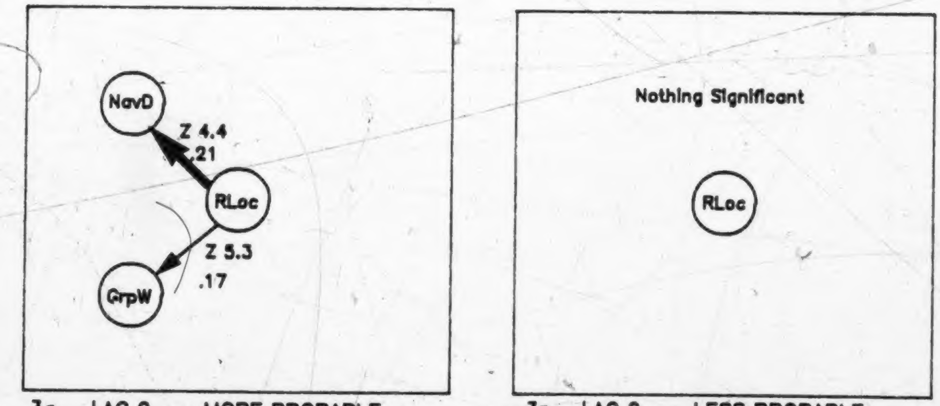
3m. LAG 7 -- MORE PROBABLE

3n. LAG 7 -- LESS PROBABLE


RLoc
Z 9.6
.55
RLoc
Inact
Z −3.7
.11
RLoc

3o. LAG 8 -- MORE PROBABLE

3p. LAG 8 -- LESS PROBABLE


NavD
Z 4.4
.21
RLoc
Z 5.3
.17
GrpW
Nothing Significant
RLoc

3q. LAG 9 -- MORE PROBABLE

3r. LAG 9 -- LESS PROBABLE

TRANSITIONAL DIAGRAMS FOR EXCESSIVE WANDERERS

When restless locomotion was the criterion behaviour in the analyses it was followed by a return to restless locomotion at significant frequencies at lags 2, 4 and 8, but not thereafter (to distinguish transitional probabilities from the simple probabilities the B/C notation will be used, signifying that the probability is for a transition to a behaviour following a criterion; thus for lags 2, 4 and 8 *p*B/C .47, *p*B/C .31 and *p*B/C .17, respectively, with *Z* scores decreasing from 17.97, to 10.85 and 3.94). Navigational difficulty followed the criterion instance of restless locomotion at significant frequencies only at lags 1, 2, 3, 5, 7, and 9 (*p*B/C .32, *Z* 12.52; *p*B/C .16, *Z* 5.66; *p*B/C .24, *Z* 9.31; *p*B/C .27, *Z* 9.13; *p*B/C .29 *Z* 7.38; and *p*B/C .20, *Z* 3.93, respectively). The one incident in which a nonwanderer absconded from a room or activity occurs at lags 1 and 3 (*p*B/C .05 and *p*B/C .06, respectively, with corresponding *Z* scores of 8.38 and 8.94). Similarly, group walking occurred at significant frequencies at lags 1 and 3 (*p*B/C .09 and *p*B/C .06, respectively, with corresponding *Z* scores of 7.35 and 3.81). Purposive walking also occurred at significant frequencies for three lags for the nonwanderers, although it did not appear at significant frequencies for either of the groups of wanderers (lag 1, *p*B/C .14 *Z* 5.93; lag 3, *p*B/C .12, *Z* 4.86; and lag 5, *p*B/C .09, *Z* 3.68).

Group walking. Group walking appeared to be quite similar among the nonwanderers and the two groups of wanderers, perhaps because group walking involved members of all groups. Following a criterion instance of group walking, all groups had significant transitional probabilities for restless locomotion, group walking and navigational difficulty (e.g., excessive wanderers, lag 1--restless locomotion *p*B/C .81, *Z* 10.79; lag 2--group walking, *p*B/C .43, *Z* 12.93; and navigational difficulty, *p*B/C .30, *Z* 5.16; moderate wanderers, lag 1--restless locomotion, *p*B/C .60, *Z* 16.52; and navigational difficulty *p*B/C .19, *Z* 6.90; lag 2--group walking, *p*B/C .43, *Z* 28.60; and navigational difficulty, *p*B/C .12 *Z* 3.66; and nonwanderers: lag 1--restless locomotion, *p*B/C .50, *Z* 8.52; and navigational difficulty *p*B/C .25, *Z* 4.14; lag 2--group walking, *p*B/C .50, *Z* 12.12). The significance of restless locomotion in these analyses support the alternation of group walking and restless locomotion suggested by the analyses with restless locomotion as the criterion. However, to confirm the three-behaviour sequence it is necessary for these two behaviours to occur at significant frequencies in the analyses for navigational difficulty as well.

The major difference between the three groups was that nonwanderers had no particular behaviour that occurred with a significant frequency after lag 3 (when restless locomotion had a transitional probability of 1.0, *Z* 8.69), whereas both groups of wanderers persevered through many successive transitions of the three behaviours, restless locomotion, group walking and navigational difficulty. This suggests that when nonwanderers were involved in group walking, intervening behaviours could bring their walking to a halt, although if any particular behaviour had been implicated in the cessation of group walking it should have occurred in sufficient frequency for it to have been significant and been evident in the analyses. Social activities, focal activities and inactivity appeared to be incompatible with excessive and moderate wanderers' group walking, because they occur significantly less often than expected. None of these behaviours occurred either more or less often than expected for nonwanderers.

The behaviours that preceded the criterion incident of group walking were different across the three groups. Prior to the criterion instance, the nonwanderers were apt to have been fiddling (significant frequencies with *p*B/C 1.00 occurred at lags -17, -15, -13 and -11, with *Z* of 3.08, 3.19, 3.36 and 3.31, respectively) to have been walking with some evident purpose (significant frequencies at lags -7, -5, -2 and -1, *p*B/C .50, .20, .20 and .20, with *Z* of 9.08, 5.66, 4.08, and 3.99, respectively) or to have been unobserved (lag -4, *p*B/C .40, *Z* 18.39). The three behaviours that were part of the general pattern of group walking also occurred. Moderate wanderers, prior to the criterion incident of group walking, were apt to have absconded from a room or activity (significant frequencies occurred at lag -24, -22, -20, -17, and -15, with *p*B/C ranging from .09 to .25 and *Z* scores ranging from 7.87 to 3.28) or trespassed (lag -9, -7, and -6, *p*B/C .06, .02 and .02, with *Z* scores of 8.35, 4.02 and 3.98, respectively). The three behaviours that were part of the general pattern of group walking also occurred. In contrast, the excessive wanderers were apt to have been involved only in the three behaviours, restless locomotion, group walking, and navigational difficulty for as many as 14 lags before the criterion. The austerity of their pattern, in comparison to the other two groups, suggests excessive wanderers had a more resolute attitude toward group walking because fewer behaviours interrupted, or occurred within the context, of their locomotion (in sufficient amounts to be significant).

Navigational difficulty. All groups evidenced navigational difficulty according to the lag sequential analyses using that behaviour as the criterion. This hesitation at choicepoints and/or scanning of the environment was a statistically significant part of the pattern of both restless locomotion and group walking for all groups. However, whereas navigational difficulty continued through many behaviour transitions for both groups of wanderers, the nonwanderers had no behaviours occurring with frequencies greater, or less, than chance after lag 6. Moreover, for the nonwanderers restless locomotion followed navigational difficulty significantly greater than chance for only the first three lags. The results confirmed the three behaviour sequence of navigational difficulty, restless locomotion, and group walking that was discussed under headings for the latter two behaviours.

Searching. Searching was not part of any behavioural pattern, possibly because it occurred so seldom. The only association that searching had with any other wandering behaviour was its occurrence in significant amounts for moderate wanderers at lag 1 (pB/C .50, Z 24.02) when navigational difficulty was the criterion event. The time-based probability of moderate wanderers engaging in searching was .0008, whereas the time-based probability for nonwanderers was .0002. The excessive wanderers did not engage in searching.

Absconding from the top floor. Based on the data, only incidents of absconding from the floor and absconding from a room or activity occurred during observational sessions. Absconding from the nursing home was not directly observed although it did occur; this is discussed further in Study 3. In Table 4 and Table 5, the criterion behaviour is absconding from the floor and the behaviours that preceded it significantly more than statistically expected are listed in the upper portion of the tables (i.e., the negative lags).

Table 4

EXCESSIVE WANDERERS' TRANSITIONAL PROBABILITIES

Behaviours that precede and follow absconding from the floor significantly more than expected

ODD LAGS - PRECEDING				EVEN LAGS - PRECEDING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
Prior lags have none significant.							
-3	NavD	1.00	3.17	-4	AbsF	1.00	17.05
-1	None			-2	AbsF	1.00	26.68
ODD LAGS - FOLLOWING				EVEN LAGS - FOLLOWING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
1	None			2	AbsF	.67	26.68
				2	AbsR	.33	4.71
3	None			4	AbsF	.33	17.05
				4	AbsR	.33	4.39
				4	Tres	.33	6.86
5	None			6	AbsR	.50	5.03
				6	Tres	.50	9.25
7	None			8	Tres	1.00	11.46
Subsequent lags have none significant.							

Notes: Legend: AbsF, absconding from the top floor to a lower one; AbsR, absconding from a room or activity; Tres, trespassing; NavD, navigational difficulty.

To obtain a study-wise alpha level of .05, Bonferroni's correction was made. Thus, Z scores of ≥ ±3.08 are significant (rather than Z scores of ≥ ±1.96) for a two-tailed test.

Table 5

MODERATE WANDERERS' TRANSITIONAL PROBABILITIES

Behaviours that precede and follow absconding from the floor significantly more than expected

ODD LAGS - PRECEDING				EVEN LAGS - PRECEDING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
Prior lags have none significant.							
-9	RLoc	1.00	3.51	-10	None		
-7	RLoc	1.00	3.39	-8	None		
-5	RLoc	1.00	4.60	-6	Tres	1.00	28.37
-3	RLoc	1.00	5.55	-4	NavD	.50	3.42
-1	RLoc	.83	6.36	-2	AbsF	.33	14.60

ODD LAGS - FOLLOWING				EVEN LAGS - FOLLOWING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
1	RLoc	.71	5.90	2	AbsF	.14	14.60
3	RLoc	.57	4.60	4	None		
5	None			6	None		
7	NavD	.50	3.37	8	Fidd	1.00	3.71
9	None			10	None		

11	Tres	.50	15.44	12	None		
13	RLoc	1.00	3.48	14	None		
15	RLoc	1.00	3.63	16	NavD	1.00	5.29
17	RLoc	1.00	3.73	18	NavD	1.00	5.28
19	RLoc	1.00	3.95	20	NavD	1.00	5.42
21	RLoc	1.00	4.16	22	None		
23	RLoc	1.00	4.41				

Subsequent lags have none significant.

Notes: Legend: AbsF, absconding from the top floor to a lower one; Fidd, fiddling; RLoc, restless locomotion; Tres, trespassing; NavD, navigational difficulty.

To obtain a study-wise alpha level of .05, Bonferroni's correction was made. Thus, Z scores of ≥ ±3.08 are significant (rather than Z scores of ≥ ±1.96) for a two-tailed test.

Separate columns for the even and odd numbered lags permit the similarity between items in the columns to be seen more easily and *Z* scores are listed to help evaluate the transitional probabilities. The data in Table 4 are for the excessive wanderers' group and those in Table 5 are for the moderate wanderers' group. Nonwanderers had no occurrences of absconding from the floor to analyze.

The pattern of absconding from the floor was quite different in the two groups. Because only one of the two excessive wanderers absconded from the floor, Table 4 represents only participant S's pattern of absconding (on three occasions). Interestingly, restless locomotion *did not* occur with significant frequency in the context of participant S's absconding from the floor. Both the activities of trespassing and absconding from a room or activity where he was supposed to stay, followed absconding from the floor significantly more than was expected. "None" appears in the table for most of the odd numbered lags, indicating that there was no particular behaviour that occurred significantly more than expected on these lags. That is, various behaviours intervened but none more frequently than one would expect by chance. Participant S's pattern of absconding, with the occurrence of trespassing and two levels of absconding, appears to reflect a persistent motivation to go somewhere other than the wing where he normally resides.

When the raw data were examined, so that particular instances could be seen in the actual time frame in which they occurred, one incident appears to reflect such persistence. Participant S had been standing near the elevator and absconded into it when the doors remained open. He pushed the elevator button(s) and left the first time the doors opened, before the main level. He was intercepted by an orderly and was returned to his lounge where others were seated but inactive. He was encouraged to stay, but immediately left, trailing the orderly at some distance. He subsequently trespassed, entering a bedroom on another wing. Other explanations, besides the participant being motivated to leave his wing, are possible, but he normally travelled the hallways and did not trespass, just as he normally spent time in the central area without leaving the floor.

Trespassing was associated with absconding from the floor for both the excessive and the moderate wanderers, although it was not necessary to enter any private bedroom in order to leave the floor.

Table 5 indicates this association at Lag -6 (*pB/C* 1.0, *Z* 28.37) and Lag 11 (*pB/C* .50 *Z* 15.44) for the moderate wanderers. The restless locomotion prior to the absconding is not surprising, given that some form of walking would seem to be necessary in order to leave the floor. Because these participants had statistically significant occurrences of restless locomotion for a brief number of lags before they left the floor, they may have come upon a method of egress while walking.

Two things suggest that the moderate wanderers' behaviour pattern for absconding from the floor involved three other activities: restless locomotion, navigational difficulty and trespassing. First, the three activities occurred in significant amounts in association with the criterion instance of absconding. Second, absconding from the floor occurred in significant amounts when each of those three behaviours are analyzed in turn. However, the pattern was not expressed in many incidents; four of the six participants in this group had seven instances of absconding from the floor.

The excessive wanderer (participant S) exhibited a contrasting pattern of absconding that is puzzling. He apparently scanned the environment, evidenced by the navigational difficulty at Lag -3 in Table 4. Then he took the closest exit as in the elevator incident previously described. (It is possible his pattern evolved from his early days in the institution, when he was allowed to leave for daily periods to visit his wife at a nearby hospital.)

Absconding from a room or activity. Absconding from a room or activity followed a very different pattern from that of absconding from the floor. The data in Table 6 represent the excessive wanderers' pattern for absconding from a room or activity and those in Table 7 are the moderate wanderers' pattern for absconding from a room or activity. Nonwanderers had only one occurrence of this behaviour and there were no significant behavioural transitions when this level of absconding was the criterion for analyses. This suggests that occurrence of absconding from a room that was a significant component in the analyses for restless locomotion is not part of a reliable pattern (cf. the section entitled restless locomotion above).

Although navigational difficulty also appeared in the pattern of absconding for both moderate wanderers and excessive wanderers, it appeared more often in the analyses for excessive wanderers, occurring several times immediately before the criterion event and for several lags after. These brief halts to scan the environment seem to suggest some indecision about leaving or where to go.

Table 6

EXCESSIVE WANDERERS' TRANSITIONAL PROBABILITIES

Behaviours that precede and follow absconding from a room or activity significantly more than expected

ODD LAGS - PRECEDING				EVEN LAGS - PRECEDING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
Prior lags have none significant.							
-17	None			-18	AbsR	.50	5.66

-15	None			-16	AbsR	.67	8.52
-13	Unob	.17	4.06	-14	AbsR	.75	11.36
-11	Unob	.11	4.05	-12	AbsR	.57	12.19
-9	None			-10	AbsR	.56	13.22
-7	None			-8	AbsR	.55	15.60
-5	NavD	.43	4.62	-6	AbsR	.54	16.91
				-6	AbsF	.08	5.03
-3	NavD	.33	3.29	-4	AbsR	.57	18.91
				-4	AbsF	.07	4.39
-1	Fidd	.40	3.11	-2	AbsR	.67	22.42
-1	NavD	.33	3.13	-2	AbsF	.07	4.71

ODD LAGS - FOLLOWING				EVEN LAGS - FOLLOWING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
1	Fidd	.40	3.24	2	AbsR	.71	22.42
				2	Tres	.07	3.32
3	Fidd	.46	3.37	4	AbsR	.73	18.91
5	None			6	AbsR	.78	16.91
				6	Unus	.11	4.20
7	None			8	AbsR	.86	15.60
9	NavD	.50	3.46	10	AbsR	.83	13.22
11	NavD	.60	4.09	12	AbsR	1.00	12.19
13	NavD	1.00	5.03	14	AbsR	1.00	11.36
15	NavD	1.00	3.71	16	AbsR	1.00	8.52
17	None			18	AbsR	1.00	5.66

Subsequent lags have none significant.

Table 7

MODERATE WANDERERS' TRANSITIONAL PROBABILITIES

Behaviours that precede and follow absconding from a room or activity significantly more than expected

ODD LAGS - PRECEDING				EVEN LAGS - PRECEDING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
Prior lags have none significant.							
-23	AbsR	1.00	17.49	-24	None		
-21	AbsR	1.00	20.93	-22	None		
-19	AbsR	1.00	24.74	-20	Fidd	1.00	3.80
-17	AbsR	.75	19.47	-18	NavD	.33	4.30
-15	AbsR	.50	15.48	-16	AbsR	.25	6.28
-13	AbsR	.30	12.05	-14	AbsR	.29	9.50
-11	AbsR	.23	10.78	-12	AbsR	.30	12.18
-9	Fidd	.40	3.24	-10	AbsR	.29	14.77
-9	AbsR	.20	10.74	-8	AbsR	.33	18.29
-7	AbsR	.18	10.30	-8	Care	.13	4.77
-5	Fidd	.47	4.48	-6	AbsR	.35	21.15
-5	AbsR	.12	6.53	-6	Care	.12	4.33
-3	Fidd	.45	4.53	-4	AbsR	.50	30.83
-1	Fidd	.48	5.47	-2	AbsR	.56	39.94
-1	Tres	.04	4.18				

ODD LAGS - FOLLOWING				EVEN LAGS - FOLLOWING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
1	Fidd	.44	4.85	2	AbsR	.64	39.94
1	NavD	.20	4.02				

1	Tres	.04	4.43				
3	Fidd	.38	3.58	4	AbsR	.50	30.83
5	AbsR	.11	6.53	6	AbsR	.40	21.15
7	AbsR	.21	10.30	8	AbsR	.39	18.29
9	AbsR	.25	10.74	10	AbsR	.36	14.77
11	FocA	.36	3.20	12	AbsR	.30	12.18
11	AbsR	.27	10.78				
13	AbsR	.33	12.05	14	AbsR	.25	9.50
15	AbsR	.43	15.48	16	AbsR	.17	6.28
15	GrpW	.14	3.28				
17	AbsR	.60	19.47	18	None		
17	GrpW	.20	3.70				
19	AbsR	1.00	24.74	20	GrpW	.33	4.80
21	AbsR	1.00	20.93	22	GrpW	.50	5.95
23	AbsR	1.00	17.49	24	GrpW	1.00	7.87

Subsequent lags have none significant.

Notes: Legend: AbsF, absconding from the top floor to a lower one; AbsR, absconding from a room or activity; Care, given nursing care; Fidd, fiddling; FocA, focal activities; GrpW, group walking; Tres, trespassing; NavD, navigational difficulty; Unob, unobserved; Unus, unusual.

To obtain a "study-wise" alpha level of .05, Bonferroni's correction was made. Thus, Z scores of >_ +_3.08 are significant (rather than Z scores of >_ +_1.96) for a two-tailed test.

However, caregivers occasionally attempted to persuade the absconder to return, which also might account for the hesitation. Judging from the significant frequency of focal activity following absconding, the caregivers occasionally were successful in persuading the moderate wanderers to return to the activity, which was most likely a meal.

Trespassing occurred in significant frequencies in the pattern of absconding from a room or activity for both excessive and moderate wanderers. One difference was that it appeared both before and after the criterion event for moderate wanderers, whereas only after the criterion for excessive wanderers. The information provided by observers suggested that trespassing sometimes occurred when the wanderers circled the meal trolley and entered the open bedroom nearest it. There they might rummage through things. Because one of the auxiliary trolleys often was parked in this bedroom, the arrangement of the equipment may have prompted the trespassing in these instances.

The occurrence of absconding from the floor in the analyses for excessive wanderers (Table 4) can be attributed to participant S (cf. the incident involving this participant described above). Notice that the alternation of absconding from the floor prior to absconding from a room or activity is consistent with that incident. This pattern was not seen in the analyses for moderate wanderers. Other behaviours that were unique in the excessive wanderers' pattern of absconding from a room or activity were unusual activities and being unobserved. Behaviours that were unique in the moderate wanderers pattern of absconding from a room or activity were the care given by a staff member prior to the criterion behaviour and group walking a number of lags after the criterion (Table 7). When care was given a staff member may have been attempting to feed the participant, which was usually a sign that the participant was reluctant to remain at the meal. The fact that group walking followed the absconding from a room or activity suggests that the group walking of others may have prompted the participant to leave. Notice that absconding from the floor preceded but never followed absconding from a room. This is consistent with the earlier speculation that participants were returned to an activity or room where they were supposed to remain, but returning them did not ensure they would stay.

Trespassing. There was only one incident of trespassing by a nonwanderer, but the excessive wanderers had seven such incidents and the moderate wanderers had 10. The results of the lag sequential analyses for excessive and moderate wanderers, using trespassing as the criterion behaviour, are presented in Tables 8 and 9, respectively.

Table 8

EXCESSIVE WANDERERS' TRANSITIONAL PROBABILITIES

Behaviours that precede and follow trespassing significantly more than expected

ODD LAGS - PRECEDING				EVEN LAGS - PRECEDING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
Prior lags have none significant.							
-13	Unus	.50	5.87	-14	Fidd	1.00	3.63
-11	Unus	.50	6.22	-12	Fidd	1.00	3.68
-9	Unus	.67	12.22	-10	Fidd	1.00	4.44
-7	None			-8	AbsF	.25	11.46
-5	None			-6	AbsF	.25	9.25

				-6	Unus	.25	5.76
-3	None			-4	AbsF	.17	6.86
				-4	Tres	.17	5.90
-1	None			-2	AbsR	.17	3.32

ODD LAGS - PRECEDING EVEN LAGS - PRECEDING

LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
Prior lags have none significant.							
1	RLoc	1.00	4.64	2	Unus	.20	5.83
3	RLoc	1.00	3.73	4	Tres	.25	5.90
5	RLoc	1.00	3.69	6	NavD	.67	3.23
7	RLoc	1.00	3.19	8	None		
Subsequent lags have none significant.							

Table 9

MODERATE WANDERERS' TRANSITIONAL PROBABILITIES

Behaviours that precede and follow trespassing

significantly more than expected

ODD LAGS - PRECEDING EVEN LAGS - PRECEDING

LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
Prior lags have none significant.							
-11	AbsF	.25	15.44	-12	Care	.33	5.46
-11	Unus	.25	4.09				
-9	RLoc	.50	3.23	-10	NavD	.50	5.64
-9	Care	.25	4.72				
-7	Care	.20	4.14	-8	None		
-5	Care	.17	3.70	-6	NavD	.40	4.49
-3	Unus	.13	3.13	-4	None		

-1	AbsR	.11	4.44	-2	Care	.13	3.15

ODD LAGS - PRECEDING				EVEN LAGS - PRECEDING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
Prior lags have none significant.							
1	RLoc	.60	5.76	2	Fidd	.57	3.71
1	AbsR	.10	4.19	2	PurW	.14	3.49
3	RLoc	.57	4.60	4	PurW	.14	3.51
5	RLoc	.67	5.14	6	AbsF	.25	28.37
				6	GrpW	.25	3.98
7	GrpW	.25	4.02	8	NavD	.50	4.84
9	GrpW	.50	8.35	10	RLoc	.75	4.79
11	None			12	None		
13	None			14	RLoc	1.00	3.55
15	NavD	1.00	5.04	16	RLoc	1.00	3.64
Subsequent lags have none significant.							

Notes: Legend: AbsF, absconding from the top floor to a lower one; AbsR, absconding from a room or activity; Care, given nursing care; Fidd, Fiddling; GrpW, group walk; NavD, navigational difficulty; RLoc, restless locomotion; Tres, trespassing; Unus, unusual behaviours.

To obtain a "study-wise" alpha level of .05, Bonferroni's correction was made. Thus, Z scores of $\geq \pm 3.08$ are significant (rather than Z scores of $\geq \pm 1.96$) for a two-tailed test.

There were similarities in the patterns for excessive and moderate wanderers. Unusual activities and absconding from the floor both occurred at reliable frequencies before the criterion event.

Absconding from a room or activity also appeared just prior to the criterion for both groups. The tables for both groups make it evident that restless locomotion and navigational difficulty follow the criterion event. The common pattern for the two groups of wanderers seems to suggest they were in a disturbed state, engaging in unusual "demented" behaviours and not remaining where caregivers desired them to be. One might infer that the participants were "looking for another place".

Moderate wanderers had the attention of a caregiver (cf. the "care" in Table 9) prior to the criterion event, which was unique to their pattern of trespassing. As well, both levels of absconding followed the criterion event at significant frequencies for the moderate wanderers. The nonwanderers one trespassing incident was preceded and followed by an incident of navigational difficulty (Lag -1, pB/C 1.0, Z 9.92; Lag 1, pB/C 1.0, Z 8.64).

Fiddling. Fiddling was a persistent behaviour that continued for many lags, in all groups, although various other behaviours intervened. No behaviour alternated regularly with fiddling for any group and the behaviours occurring in significant amounts before and after a criterion event of fiddling varied from group to group (cf. Table 10, Table 11, and Table 12). However, either restless locomotion or group walking occurred in significant frequencies in the analyses for each of the groups, and the reverse was also true: fiddling occurred in significant frequencies during locomotion in all groups.

Some of the activities in the analyses with fiddling as the criterion behaviour were the troublesome behaviours of trespassing, absconding from the floor and absconding from the room. Thus, when fiddling was the criterion behaviour significant frequencies of trespassing occurred once in the pattern for nonwanderers (Table 12) and moderate wanderers (Table 11) and three times in the pattern for excessive wanderers (Table 10). Absconding from the floor and absconding from a room both occurred at significant frequencies in the pattern for moderate wanderers and absconding from a room also occurred in the pattern for the excessive wanderers.

Table 10

TRANSITIONAL PROBABILITIES FOR EXCESSIVE WANDERERS

Behaviours that precede and follow fiddling

significantly more than expected

ODD LAGS - PRECEDING				EVEN LAGS - PRECEDING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
Prior lags have none significant.							
-15	None			-16	Unus	.10	3.18
-13	None			-14	None		
-11	None			-12	Unob	.06	3.81
-9	None			-10	Fidd	.39	5.51
-7	Inac	.38	3.31	-8	Fidd	.33	5.16
-5	Inac	.37	3.40	-6	Fidd	.38	7.19
				-6	Unus	.04	3.24
-3	RLoc	.35	3.43	-4	Fidd	.47	11.21
-3	AbsR	.04	3.37				
-3	Unus	.03	3.26				
-1	RLoc	.41	4.65	-2	Fidd	.54	15.26

-1	Inac	.39	3.39

ODD LAGS - PRECEDING				EVEN LAGS - PRECEDING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
Prior lags have none significant.							
1	RLoc	.43	5.69	2	Fidd	.52	15.26
1	Unus	.03	4.20				
3	RLoc	.38	4.56	4	Fidd	.44	11.21
3	Unus	.03	3.86	4	Unob	.02	3.67
5	None			6	Fidd	.35	7.19
7	None			8	Fidd	.31	5.16
9	None			10	Fidd	.35	5.51
				10	Tres	.06	4.44
11	Inac	.40	3.12	12	Tres	.06	3.68
13	None			14	Tres	.09	3.63
Subsequent lags have none significant.							

Table 11

TRANSITIONAL PROBABILITIES FOR MODERATE WANDERERS

Behaviours that precede and follow fiddling

significantly more than expected

ODD LAGS - PRECEDING				EVEN LAGS - PRECEDING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
Prior lags have none significant.							
-13	Fidd	.22	4.03	-14	None		
-11	Fidd	.24	5.40	-12	None		
-9	Fidd	.23	5.81	-10	None		
				-8	Fidd	.19	3.93

-7	Fidd	.18	3.82	-8	AbsF	.01	3.71
-5	None			-6	Fidd	.23	7.43
-3	Inac	.39	3.78	-4	Fidd	.26	10.41
-3	RLoc	.15	4.79				
-3	AbsR	.02	3.58				
-1	Inac	.45	4.70	-2	Fidd	.37	19.00
-1	RLoc	.19	7.72	-2	Tres	.01	3.71
-1	AbsR	.02	4.33				

ODD LAGS - FOLLOWING				EVEN LAGS - FOLLOWING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
1	RLoc	.18	6.72	2	Fidd	.37	19.00
1	AbsR	.02	4.91				
3	RLoc	.14	4.56	4	Fidd	.27	10.41
3	AbsR	.02	4.53				
5	AbsR	.02	4.48	6	Fidd	.24	7.43
7	Fidd	.19	3.82	8	Fidd	.20	3.93
9	Fidd	.23	5.81	10	None		
9	AbsR	.02	3.24				
11	Fidd	.24	5.40	12	None		
13	Fidd	.22	4.03	14	None		
15	None			16	None		
17	None			18	None		
19	None			20	AbsR	.03	3.80
21	None			22	None		
23	None			24	None		
25	FocA	.32	4.53	26	None		

25	RLoc	.18	3.18				
27	RLoc	.23	3.67	28	None		

Subsequent lags have none significant.

Table 12

TRANSITIONAL PROBABILITIES FOR NONWANDERERS

Behaviours that precede and follow fiddling

significantly more than expected

ODD LAGS - PRECEDING				EVEN LAGS - PRECEDING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
Prior lags have none significant.							
-27	None			-28	Fidd	.39	3.33
-25	None			-26	None		
-23	None			-24	None		
-21	None			-22	None		
-19	None			-20	None		
-17	None			-18	None		
-15	None			-16	Fidd	.23	3.44
-13	RLoc	.03	4.38	-14	None		
-11	None			-12	Tres	.02	3.13
-9	Fidd	.22	4.67	-10	None		
-7	Fidd	.18	3.95	-8	None		
-5	None			-6	Fidd	.22	5.53
-3	Fidd	.16	3.66	-4	Fidd	.23	6.35
-1	None			-2	Fidd	.25	7.47

ODD LAGS - FOLLOWING				EVEN LAGS - FOLLOWING			
LAG	Beh.	Prob.	Z-score	LAG	Beh.	Prob.	Z-score
1	None			2	Fidd	.26	7.47
3	Fidd	.17	3.66	4	Fidd	.25	6.35
5	None			6	Fidd	.25	5.53
7	Fidd	.21	3.95	8	None		
9	Fidd	.24	4.67	10	PurW	.03	4.77
11	GrpW	.02	3.31	12	None		
13	GrpW	.02	3.36	14	PurW	.04	4.58
15	GrpW	.02	3.19	16	Fidd	.26	3.44
				16	PurW	.05	4.43
17	GrpW	.03	3.08	18	None		
19	None			20	None		
21	None			22	None		
23	None			24	None		
25	None			26	None		
27	None			28	Fidd	.39	3.33
29	None			30	None		
31	None			32	None		
33	None			34	None		
35	None			36	FocA	.33	3.41

Subsequent lags have none significant.

Notes: Legend: AbsF, absconding from the top floor to a lower one; AbsR, absconding from a room or activity; Fidd, fiddling; FocA, focal activities; GrpW, group walking; Inac, inactive; PurW, purposive walking; RLoc, restless locomotion; Tres, trespassing; Unob, unobserved; Unus, unusual activities.

To obtain a "study-wise" alpha level of .05, Bonferroni's correction was made. Thus, Z scores of ≥ ±3.08 are significant (rather than Z scores of ≥ ±1.96) for a two-tailed test.

There was some support for the notion that trespassing, absconding from a room, absconding from the floor, restless locomotion and fiddling were a characteristic sequence of behaviours for the wandering groups. All the analyses for the two groups of wanderers that used these four as criterion behaviours had some lag at which the frequencies of the other behaviours in the list reached significance. The pattern was not evident, however, for nonwanderers who had low frequencies of all of these behaviours except fiddling. The pattern was not as obvious as the pattern of restless locomotion, navigational difficulty, and group walking, discussed under those headings. This was because at some lags there was a random event, that is, no behaviours occurred at significant frequencies. This was evidenced by *none* appearing in the tables reporting the analyses for trespassing, absconding from a room, absconding from the floor, restless locomotion and fiddling.

Time based probabilities: Comparisons with other studies

The data were collected with a hierarchical coding scheme which prioritized the unusual as well as the social behaviours (see Appendix C), then the raw data were recoded to alter the hierarchy so that behaviours related to locomotion were prioritized (see Appendices E and G; cf. Sackett, 1987 for a similar recoding strategy). For the sequential analyses to be valid the coding scheme must be a mutually exclusive and exhaustive partition of possible events. The hierarchical scheme complied by defining codes in that way, but the scheme did not produce *true* measures of total occurrences for all categories of behaviour. Only the behaviours that were prioritized are true measures because they were scored whenever they occurred, obtaining the same measures that would have been obtained if they were coded separately (i.e., not as one of several other codes in the same observation system), whereas the behaviours not prioritized were scored *only if* none of the prioritized behaviours occurred. Thus only the prioritized behaviours in Figure 4 are considered comparable to measures in other studies. Absconding (all levels), trespassing, fiddling, searching, and unusual were all prioritized behaviours.

The two participants considered *excessive wanderers*, spent 41% of their time in wandering behaviours. Their major wandering activity, restless locomotion, consumed 23% of total time (their purposive locomotion was negligible and was a component of the *other* category in Figure 4). The two, *nonwanderers* engaged in wandering behaviours for only 8% of the time and they spent equal amounts of time in restless and purposive locomotion, 2%, with fiddling being their major wandering activity (accounting for 3% of total time). The other six participants, the *moderate wanderers*, spent 27% of their time in wandering behaviours. Restless locomotion occupied 14% of their total time and purposive locomotion approximately 2%.

The results are not dissimilar from other reports of time spent in locomotion, although the participants in the present research appeared more sedentary. Snyder et al. (1978) found that persons

Figure 4. The percentage of time excessive wanderers, moderate wanderers, and nonwanderers spent in wandering behaviours (searching, trespassing, absconding, group walking, navigational difficulty, restless locomotion and fiddling), as well as, focal activities, social activities, inactivity, and other miscellaneous behaviours. The percentages are based on focal observations of SDAT participants.

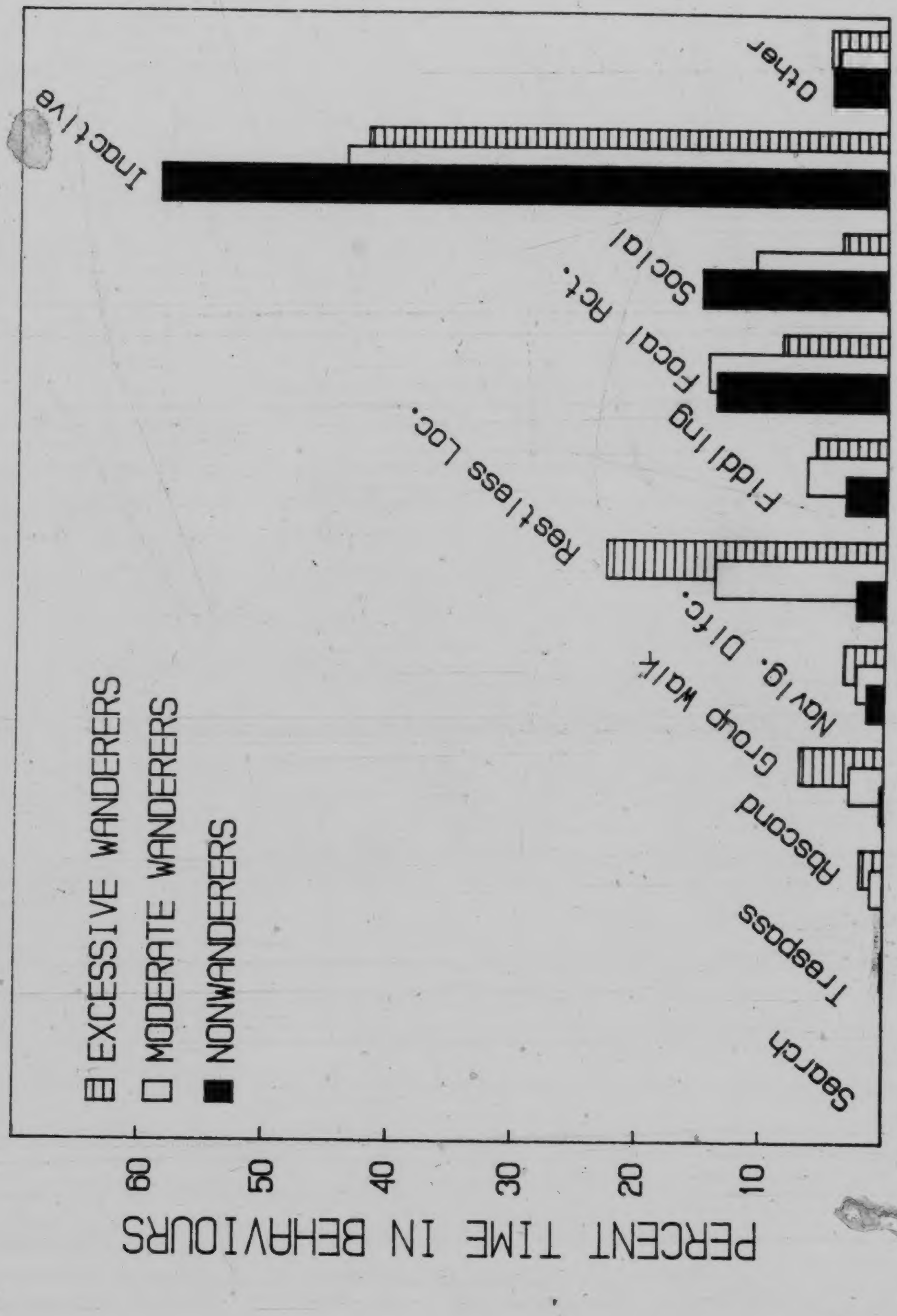

PERCENT TIME IN BEHAVIOURS
60
50
40
30
20
10
EXCESSIVE WANDERERS
MODERATE WANDERERS
NONWANDERERS
Search
Trespass
Abscond
Group Walk
Navig. Difc.
Restless Loc.
Fiddling
Focal Act.
Social
Inactive
Other

Figure 4.

designated by caregivers as wanderers spent an average of 33% of their time moving, in contrast to the 4% of those designated nonwanderers, but the researchers did not discriminate between different types of locomotion. Meacher (1972) found severely demented residents spent 28% of the time in wandering locomotion, approximately double the time they spend in purposive locomotion (15%). Those classified as moderately demented spent only 0.3% of their time wandering. Meacher noticed that cognitively alert residents did not engage in wandering behaviours.

Meacher did not include trespassing, absconding, group walking, or navigational difficulties, in his coding scheme although he did measure fiddling and searching. He noticed that severely demented persons did not engage in searching and moderately demented persons engaged in more than twice as much as rational residents. The searching behaviours were thus inversely related to the subjects' level of dementia and amount of wandering locomotion. Snyder et al. (1978) must also have observed considerable amounts of searching behaviours, although no statistics were reported, because they decided *post hoc* that searching characterized one style of wandering. In the present research, however, only three incidents of searching were seen during the observational sessions. The meagre evidence of searching, in comparison to that found by Meacher (1972) and very likely found by Snyder et al. (1978), may have been because subjects in the present research were more severely demented. Definitional differences also may have been the cause. Meacher found that fiddling with clothes or nearby objects consumed 13% of the severely demented residents' time, 18% of the moderately demented residents' time, and 5% of the rationale residents' time. None of the participant groups in the present research, that would be comparable to Meacher's groups, exhibited rates like these. Fiddling behaviours accounted for only 7%, 12% and 12% of all activities for the groups of nonwanderers, moderate wanderers and excessive wanderers, respectively. Meacher's higher figures for fiddling may be attributable to the timing of his observations which were done only between meals (eating accounted for only 3-5% of total time for any of his groups) and differences between his coding scheme and the one used in the present research. Different coding schemes that divide the stream of behaviour in different ways and the choice of an observational method will have an effect on the time budgets (Appendix G).

As noticed in the event based probabilities (Figure 1) the major behavioural difference in the three groups, other than in the extent of their wandering behaviours, was in their social activity and inactivity. The percentage of time spent in social activity (because of the prioritization of wandering behaviours this would be social activity alone without concurrent wandering behaviours) for excessive wanderers was considerably lower (3.7%) than the moderate wanderers' (10.8%), which was in turn lower than that of nonwanderers' (15.1%). The percentage of time they were inactive (with no other concurrent behaviour) was highest for the nonwanderers (58.7%) with moderate wanderers next highest (43.7%) and excessive wanderers only slightly lower (42.0%).

Unusual activities such as talking to oneself and evidencing hallucinations or delusions on average consumed less than 0.5% of the SDAT participants' time, with excessive wanderers total being 0.1%; moderate wanderers 0.4%; and nonwanderers 1.2%. Although Snyder et al. (1978) found that wanderers engaged in more disturbing behaviours such as screaming and calling out, the association found here between the proportion of wandering behaviours in which participants engaged and the proportion of unusual activities was in the opposite direction. This was largely due to one nonwanderer who was coded as talking to herself at great length (in Polish). (Most of the time she appeared to be conversing with another resident, who responded in Polish, but when he left she often kept talking.)

Discussion

Two questions central to the issues surrounding wandering behaviours have been answered by the lag sequential analyses. The questions are what is the probability of one of the dangerous wandering behaviours occurring and what is the probability of a seemingly innocuous behaviour evolving into a dangerous behaviour. The most dangerous behaviours related to wandering are said to be absconding from the building and trespassing (Zimmer, Watson, & Treat, 1984). Absconding can put an SDAT resident in danger of harm outside the home from extreme weather conditions, traffic and other environmental hazards. Inside the home a major risk may be the equipment and appliances with which these residents are no longer competent to deal. However, trespassing can be dangerous because wanderers may become victims of a resident who decides to defend his or her territory (Donat, 1986; McKeen & Coulter, 1987). A relationship has been assumed to exist between these dangerous activities and the restless locomotion engaged in by some persons with SDAT. There is some support for this assumption in the results of this study, but there is also evidence against the assumption.

Absconding from the facility and floor. Absconding from the nursing home was likely to have had the most potential for danger of all the behaviours studied, but it was not directly observed during the continuous observations. There was, therefore, no chance to determine whether there was a relationship between that level of absconding and restless locomotion in the present study. Restless locomotion occurred repeatedly yet never resulted in a participant leaving the nursing home during the observational periods.

Absconding from the top floor to a lower floor at this nursing home could be dangerous because of the possibility that the residents' ambulation might carry them into unsafe areas. There were a number of incidents of wanderers absconding from the top floor, but there were no instances in which absconding from the floor evolved into absconding from the building. The event based probabilities of a participant absconding from the top floor was .002 for the excessive wanderers, .001 for the moderate wanderers and zero for the nonwanderers according to the behavioural sample in the present study. Thus this type of absconding was a rare event in their behavioural repertoire. Restless locomotion could be assumed to be implicated in absconding from the floor because wanderers would have more opportunities to be in the vicinity of the elevator and central stairs when other residents and visitors were coming and going. This notion was supported by finding that restless locomotion was part of the moderate wanderers' pattern of absconding from the floor. The relationship did not hold true, however, for the excessive wanderer who absconded from the floor. The excessive wanderer did not engage in restless locomotion before absconding (no behaviour reliably predicted his absconding). Moreover, the other excessive wanderer, who exhibited far greater frequencies of restless locomotion than anyone else, never absconded from the floor. Two of the moderate wanderers also had no incidents of absconding from the floor. Consequently, the amount of restless locomotion was not a predictive factor in absconding.

When transitional probabilities are considered there was a probability of .01 that restless locomotion would become absconding from the floor, for the moderate wanderers, at the first behaviour transition after restless locomotion. The transitional probability never rose higher than that rather low level.

Surprisingly, trespassing, which was seldom seen, was related to absconding from the top floor. Although absconding from the nursing home's top floor had a very low event based probability, transitional probabilities indicated that trespassing very likely would be associated with it (transitional probabilities ranged from .10 to 1.00 at various lags), even though the "escape route" did not require trespassing. Thus, trespassing, rather than restless locomotion, was a good predictor of absconding for these participants. Restless locomotion also occurred during the moderate wanderers' absconding, but restless locomotion was associated with many behaviours and therefore was comparatively useless as a signal.

Absconding from activities or rooms. Absconding from activities, such as meals, or from rooms, such as when participants had been put to bed, was a more common type of absconding, but the event based probability for all participants was still only .005. These events happened very suddenly without any significant amount of restless locomotion preceding them, therefore, there was no significant relationship between restless locomotion and this level of absconding. The behaviour played a significant role in the pattern of absconding from the floor, as well as the pattern for trespassing. The fact that absconding from a room or activity was implicated in these two behaviours suggests that it might also alert caregivers to the participants' interest in putting distance between themselves and their current surroundings. Caregivers in the home did not view absconding from a room or activity with alarm. Although they were usually concerned when residents left their bedroom after being put to bed, or left a meal before finishing, their concern was focused on the activity the residents were missing not on the possibility that the residents would leave the floor or trespass.

Restless locomotion. Although the excessive wanderers and moderate wanderers differed in the way they exhibited many of the wandering behaviours, the patterns of restless locomotion for the two groups were remarkably similar. One major difference, however, was that absconding from the floor played a role in the pattern of restless locomotion for moderate wanderers, whereas it was not a component for excessive wanderers. Trespassing was a significant part of the pattern of restless locomotion for both groups. The dominant feature of the pattern of restless locomotion for both groups of wanderers, however, was the recurring transitions of navigational difficulty and group walking that continued with restless locomotion for many lags.

Group walking. The pattern for group walking was also dominated by periodic recurrences of navigational difficulty, restless locomotion and group walking. This is not surprising because the participants who were engaged in restless locomotion split away from a group to walk alone and then rejoined the group when near it. When they participated in group walking, the nonwanderers pattern was much like the two groups of wanderers, but they were involved in only 4 percent of the group walking.

Fiddling. One might infer from some of the literature that fiddling could be an alternative to restless locomotion (Meacher, 1972; Snyder et al., 1978). If that were so then fiddling would not be anticipated to play a significant part in the pattern of group walking and restless locomotion. The results are consistent, however, with Hussian and Davis' (1983, cited in Hussian & Davis, 1985) observation that some wanderers engaged in stereotypic actions during locomotion. This persistent handling of objects and fidgeting, which Hussian classifies as self-stimulatory behaviour, may underlie some of the SDAT behaviours that are most irritating to those around them, that is the gathering of objects as they travel, their interference with other people's property, and the destruction of some objects, such as the removal of buttons and stitching from clothes.

Hussian and Hill (1980) found, during direct observations, that some patients with dementia were engaged in stereotypic behaviours approximately 87% of the time they were awake. Such high rates, however, were not seen in this study. Fiddling, which included stereotypic behaviours, inappropriate handling of objects, and restless body movements, had a event based probability of only .12 in the two groups of wanderers and .07 for nonwanderers. Moderate wanderers had approximately the same event based probabilities for fiddling and restless locomotion. For nonwanderers, who infrequently engaged in restless locomotion (event based probability, .001), fiddling was the most prominent wandering behaviour.

Searching. Searching, like fiddling, was seen less than anticipated. Only three participants were ever directly observed to be searching and the observers noted no inappropriate requests by participants that indicated they were searching for childhood homes or children who had grown up long ago. Thus, for these participants searching was not really a component of their wandering behaviours.

The Concept of Wandering

At this point some assessment is appropriate of the utility of having grouped these behaviours together. The initial suggestion was that *wandering* be treated as a comprehensive term for these behaviours. It was not the intention of this study to limit wandering to just these behaviours; instead I wanted to acknowledge the fact that researchers and clinicians have described wandering as being these particular behaviours and determine whether there was a relationship between them. Although one might entertain the notion that the comprehensive term is a proxy for some construct such as anxiety that underlies all these behaviours, the data provide only marginal support for such a construct. When a set of indicators, such as these behaviours, is posited to reflect an underlying construct, the items should be substantially correlated with one another. The higher the correlation the more confident one can be that the indicators are measuring the same construct.

There were some substantial correlations between the wandering behaviours as they were exhibited by the participants in this study especially considering that the behaviours were mutually exclusive and could never occur at the same time (cf. Appendix F). Correlations were certainly not high across all of the behaviours, however, when the participants were the unit of analysis. One exceptionally high correlation was the .98 between trespassing and absconding from the floor. Other substantial correlations were those between absconding from a room and absconding from the floor (.50), as well as between the former and fiddling (.64). Surprisingly, searching had relatively good negative correlations with restless locomotion and fiddling (-.55 and -.71, respectively). Not surprisingly, group walking and restless locomotion had reasonably good correlations (.52) but group walking also had a zero correlation with absconding from a room or activity. The other poor correlation was a small negative one between fiddling and navigational difficulty (-.06). Thus, the correlational evidence is only moderately good that all of the behaviours studied represent some underlying mechanism such as anxiety.

The strong evidence for the alternation of restless locomotion with navigational difficulty and group walking, or viewed from a different perspective, the occurrence of navigational difficulty and group walking in the context of restless locomotion, suggests that these behaviours are components of a behavioural sequence that characterized both groups of wanderers. The evidence is less compelling that trespassing, absconding from the room, absconding from the floor, and fiddling are components of another characteristic behavioural sequence, but the lag sequential analyses did suggest it. Analyses for the two groups of wanderers that used these as criterion behaviours all had some lag at which the other behaviours in the list had significantly high transitional probabilities.

Differentiating three groups of participants by the total frequencies of their wandering behaviours was useful. Not only were there differences among the three groups in the pattern of wandering behaviours, differences were evident in their social behaviour. The higher the frequencies of wandering behaviours, the fewer the social activities the participants included in their day. The differences found did not parallel the types of wandering behaviours described by Hussian and Davis (1983, cited in Hussian & Davis, 1985). Their classifications were drug-induced akathisia, exit-seeking, modelled ambulation (greater proportions of walking in the presence of others than in walking alone), and self-stimulatory ambulation (fiddling while walking). The latter type of wanderers had high rates of stereotypic hand-clapping and object rubbing as well, but the label does not appear to apply in this study because rates of fiddling were fairly consistent across all groups. Possibly the nonwanderers could be considered "modelers" because the ratio of their group walking to their restless locomotion was 3 to 10, whereas both groups of wanderers had ratios of 2 to 10 for these behaviours.

The three types of locomotion that Snyder et al. (1978) delineated for the wanderers that they observed did not seem appropriate to describe the participants in this study. Snyder et al. suggested one style of wandering was characterized by searching behaviour (analogous to the searching behaviour in the coding scheme used in this study). However, searching was seldom seen and it was negatively correlated with restless locomotion. These results are consistent with Meacher's (1972) results. He found that searching behaviours were inversely related to the subjects' amount of locomotion. That is, the severely confused spent none of their time looking for things, whereas the moderately confused spent 7.7% of their time in such behaviour.

Snyder et al. (1978) suggested another style of wandering was characterized by industrious behaviour (a need to keep busy with gestures reminiscent of cleaning or performing work), or nongoal-directed in which the persons was aimlessly drawn from one stimulus to another but interest was only momentarily maintained. The participants in this study, however, gave no hint that a need to keep busy was underlying their locomotion. Nongoal-directed locomotion was exhibited at times by all participants but because it was purportedly dependent upon the number of stimuli in the environment (other people and the activities in which they were engaged; Snyder et al., 1978) and because no count was made of the total number of stimuli available throughout the periods of locomotion, it is not possible to tell whether stimuli had a reliable influence or not.

The analyses of the wandering behaviours have interesting implications for the management of persons with SDAT. For example, prevention of absconding from the floor in the present nursing home could be viewed as a design issue. Absconders did not leave through the fire exit adjacent to their lounge, although they passed it constantly. The primary exit point was the central stairway and the elevator. Demented residents could have been easily stopped from absconding from the floor with environmental strategies such as an electronic detecting system. Or they might have been deterred by a grid-like floor pattern in front of the main stairwell and the elevator (Hussian & Brown, 1987).

Trespassing appeared to be a useful behaviour in signaling that the participants were "in the mood" to abscond and might at minimum leave the floor. Absconding from the floor could happen without any prior restless locomotion (as participant S demonstrated), although for most absconders (i.e., the moderate wanderers) restless locomotion did precede the event. Because restless locomotion occurred so frequently and so seldom resulted in absconding from the floor, the extreme measures, such (e.g., drugs in sufficient doses to inhibit locomotion and body restraints) seem unduly severe.

Social and focal activities, both of which had a high frequency, appeared to be incompatible with many of the wandering behaviours, particularly with restless locomotion and group walking. This suggests that structures programs planned to involve SDAT residents in more social and focal activities, during their long periods of inactivity, might decrease these wandering behaviours.

Study 2

Gilleard's (1984) review of methods for assessing the cognitive impairment of the elderly cites a number of studies that suggest caregivers' ratings are unreliable (cf. Kuriansky, Gurland, & Fleiss, 1976; Platt, 1980). For example, Gilleard and Rizvi (cited in Gilleard, 1984) found that the interrater reliability of judgements was remarkably poor among nurses who were asked simply to rate *degree of dementia* on a 6-point Likert scale. The reliability was measured by Cohen's kappa which yielded values ranging from -0.05 to +0.19. Other recent studies have discredited caregivers' ratings of the functional performance of elderly demented persons because of problems with concurrent and predictive validity (La Rue, Watson, Larson & Kukull, 1988; Loewenstein et al., 1988; Skurla, Rogers, & Sunderland, 1988).

There is evidence, as well, that caregivers' general evaluations of elderly patients' behaviour are unreliable. Certainly, caregivers' reports of the activities of nursing home residents are at odds with observational studies in a number of respects. For example, one of the most consistent findings from observational studies is that nursing home residents are inactive most of the time (Gottesman and Bourestom, 1974; McClannahan & Risley, 1975; Sommer & Ross, 1958). McClannahan and Risley (1975) found that at any given time most residents were either sitting (63%) or lying (23%). In a large behavioural survey Gottesman and Bourestom (1974) briefly sampled activity in 40 nursing homes yielding 27,456 observations. Although these observations were made during peak daylight hours, in 56% of them the residents were doing nothing or were passively sitting or standing. Social activities and personal care consumed 43% of the residents' time. The fact that Gottesman and Bourestom (1974) found that residents were in contact with a professional or nonprofessional staff member only 2% of the total time suggested that residents' exhibited very little behaviour that was disturbing enough to require caregivers' attention. It also makes it doubtful that caregivers could accurately report the *frequency* of residents' behaviours.

Caregivers' ratings of residents' behaviours present a very different picture from Gottesman and Bourestom (1974). Inactivity is not part of the picture. For example, when Cohen-Mansfield, Marx, & Rosenthal (in press) asked charge nurses about residents the researchers were told that 93% of 408 residents in the nursing home manifested one or more agitated behaviours at least once a week and some manifested as many as 23. Over the period of a week, during the day shift, each resident was said to average three different disturbing behaviours. Two behaviours of particular interest to the present study were measured by asking charge nurses to report the frequency of their occurrence. As a result Cohen-Mansfield et al. reported that general restlessness and pacing (i.e., aimless wandering, cf. Cohen-Mansfield, 1986) tended to occur several times per day for 26% of the residents (never for others). These "frequencies", however, are, at best, rough estimates or impressions of behaviour and are not based on any systematic method of observation. Certainly, no other study reports such a high percentage of wanderers in a nursing home population. Prevalence rates vary from 10 to 18% (Blasch, 1988; Dawson & Reid, 1987; Hiatt, 1988; Mann et al., 1984). Meacher's (1972) observational study found

19.6% of the population were wanderers in three special homes for confused elderly persons but the in ordinary long-term care facilities only 5.8% were wanderers.

Such an overestimation of prevalence rates and the apparent bias against considering the time taken by mundane pursuits, and inactivity, underscores the lack of reliability in caregivers' reports. Second- and third-hand retrospective accounts cannot present an accurate picture of the frequency, patterns, and extent of the wandering behaviours nor can they accurately describe the sequence of behaviours in an absconding incident. Moreover, retrospective reports can seldom be verified in any satisfactory way (Platt, 1980).

Studies that question the reliability of caregivers' judgements have a bearing on the research on wandering behaviours because empirical studies focusing on this topic typically have selected subjects on the basis of caregivers' ratings of whether the individuals were wanderers or not (Cornbleth, 1977; Dawson & Reid, 1987; de Leon et al., 1984; Snyder et al., 1978). Although there are no studies that evaluate caregivers' ratings of wandering behaviours, there is no reason to expect that caregivers' would be more accurate when rating wandering than they would be on other behavioural dimensions.

The present study evaluated the accuracy of caregivers' ratings by comparing them, for each participant in Study 1, with the behavioural data for the participant. The caregivers were asked, after the observations of Study 1 were completed, to judge whether the SDAT participants were wanderers or nonwanderers and to rate the extent to which each of the participants manifested each of the wandering behaviours (described in Appendix A). The caregivers were also asked to provide their definitions of wandering.

Method

Subjects

The SDAT participants were the same 10 residents of the nursing home observed in study 1. Twelve nursing home staff members who worked with the participants on a regular basis were questioned about them. Platt (1980) has maintained that questioning different "subcultures" is necessary for across-interview agreement to be a satisfactory test of validity. Therefore, those questioned included all of the evening and day shift nurses (3), the charge nurse, and all of the evening and day shift nursing assistants who were regularly assigned to the special unit during the study (6), as well as the ward clerk (1) and the recreation staff member (1) assigned to the special unit. The average number of years they had worked at the nursing home was 6.9 (nurses, *M* 7.5, *SD* 6.1; nursing assistants *M* 6.7, *SD* 2.4, range 3-9; recreation staff and ward clerk *M* 7.0, *SD* 5.7, range 3-11). The participants had been in the nursing home an average of 1.1 years (*SD* 0.8). These caregivers were all permanently assigned to the second floor or the special wing, therefore they were very familiar with the residents.

Instruments

The Wandering Index, a questionnaire designed for the study, was used to collect information from the caregivers about the SDAT participants (Appendix H). Items were written to query caregivers specifically about the types of events that were classified as wandering behaviours (cf. Appendices A and E). Thus the questionnaire included three items about absconding from the nursing home, three items about absconding from the floor, one item about absconding from a room or activity, three items about navigational difficulties, and one each about trespassing, restless locomotion, fiddling and searching. There were no items about group walking. More items were included that pertained to absconding from the floor and absconding from the nursing home because such events were considered to have the most impact for staff members. Memory for such events would be expected to be more accurate because of the attention paid to instances of absconding from the floor and the building. One of the items that dealt with each of these two topics required a yes/no answer. The forced choice items were inserted to judge the reliability of the more general questions on the same topic and to elicit more accurate answers to subsequent items.

The open-ended items were placed first so that the staff members' responses would not be biased by subsequent items. Thus, the first item forced a decision about the person under discussion and it was immediately followed by another other open-ended question that prompted the caretaker to recall specific incidences. Subsequent items asked about rates of specific behaviours. Because the questionnaire was intended to assess *usual* behaviours rather than optimal or minimal levels the word "typical" was used in some items. The wording of items and their psychological sequencing was determined by pretesting the questionnaire with members of the nursing home's administrative staff, so that the order seemed natural and obtained the results mentioned above.

Procedures

The items were presented by the investigator to each caregiver individually. Each presentation of the questionnaire, on average, took less than 10 minutes. Caregivers were requested not to discuss the questionnaire with other caregivers during the week that interviews were conducted in order to retain the independence of the judges.

Because past behaviour would normally be the basis of caregivers' judgements, the caregiver interviews were conducted after the behavioural study (e.g., Dawson & Reid, 1987, and Hiatt, 1985, inquired about the previous 3 months in their surveys). The caregivers were asked to recall the period of time, a 3 month duration, when the observational team was in the nursing home and to answer the items for that period of time (see the instructions in Appendix H). Caregiver interviews were conducted nearly one year after observations were completed. The caregivers reported no difficulty in the task, however, perhaps because they knew the SDAT participants so well; except for the charge nurse, who was the most recent staff member, all caregivers had known all of the participants since they arrived at the nursing home.

Each caregiver interview began with the researcher explaining the goal of the questionnaire. The caregiver was asked to write on a blank sheet of paper her answer to the first open-ended item, which asked for the caregiver's own definition of wandering. The researcher then recorded all subsequent answers.

The 12 caregivers answered all items of the Wandering Index for each of the 10 SDAT participants. To summarize a caregiver's assessment of the SDAT participant's wandering behaviours, an index was computed from the items that were answered on the five-point Likert scale (Bohrnstedt & Knoke, 1982). Answers that indicated a minimal amount of wandering behaviour were counted as zero and answers that indicated a maximal amount were counted as 4, with the intermediate levels being scored as 1, 2, and 3, respectively. Thus for Items 2, 3, 6-12, 12 and 16 the *a* answer received a zero, *b* 1, *c* 2, *d* 3, and *e* 4, and for Items 4 and 5 the scoring was reversed, that is, *a* received 4, etc. The open-ended questions and the items that were answered yes or no were used to evaluate intraobserver reliability. That is, if the caregiver said that it was the nature of the participant to leave the nursing home (Item 12), then one would expect that the caregiver would answer yes when asked if she knew of some instance in which the participant absconded from the home (Item 15). If the answer was *no* to the latter item then the answers to Item 12 and other items on the same topic may have been made on the basis of second-hand, rather than first-hand information, and would therefore be less dependable. The validity of the Wandering Index was tested by comparing caretakers answers for each of the 10 SDAT participants with behavioural observations of the participants.

Results and Discussion

The central question was whether caregivers' assessments of the SDAT participants' wandering behaviours agreed with the behavioural observations. A number of other relevant questions can be posed as well. For example, what was the level of agreement among caregivers in their rating of SDAT participants? Were nurses as good at assessing behaviours as those caregivers' who helped the participants with activities of daily living? The basic unit of analysis in this study was the individual participant, but other questions shifted the focus to the various behaviours measured by the questionnaire. When caregivers' results were compared to the behavioural data were they more accurate in reporting some behaviours than others? What sort of information influenced the caregivers in deciding whether the participant was a wanderer or not? The open ended introductory item of the questionnaire also permitted an examination of the caregivers' definitions of wandering.

Caregivers' Judgements vs. Behavioural Data

Two types of judgements about SDAT participants were solicited by the questionnaire. Item 1, a forced choice, asked the caregivers whether the participant was a wanderer or not. Another assessment of the participants' wandering behaviours was obtained from each caregiver by deriving an index from all of the Likert-scale items. Both types of judgements were compared with each other and with the results of the chi-square partitioning in Study 1 that was based on behavioural data.

The Behavioural Analysis and Question One Results

The chi-square partitioning in Study 1 indicated that two participants exhibited very low levels of the wandering behaviours, but the rest all exhibited substantial amounts of wandering behaviours. Thus in classifying the participants into wanderers and nonwanderers, the caregivers should have distinguished only two nonwanderers (participants L & I). Table 13 shows that the caregivers' judgements on Item 1 did not match the behavioural data. All caregivers agreed that participants G, M, P, E, S, and T were wanderers and that participant N was not a wanderer. The remaining participants (H, L, and I) all had more than one caregiver who thought they were wanderers, although the majority disagreed.

Table 13

CAREGIVERS' RATINGS OF SDAT PARTICIPANTS' WANDERING

SDAT Participants

Staff		G	H	L	M	I	P	E	N	S	T
E	R.N.1	Y	-	-	Y	-	Y	Y	-	Y	Y
D	R.N.2	Y	-	-	Y	-	Y	Y	-	Y	Y
D	R.N.3	Y	-	-	Y	-	Y	Y	-	Y	Y
D	R.N.4	Y	-	-	Y	-	Y	Y	-	Y	Y
D	Aide1	Y	-	Y	Y	-	Y	Y	-	Y	Y
D	Aide2	Y	Y	-	Y	-	Y	Y	-	Y	Y
D	Aide3	Y	-	-	Y	Y	Y	Y	-	Y	Y
E	Aide4	Y	-	Y	Y	-	Y	Y	-	Y	Y
E	Aide5	Y	-	-	Y	-	Y	Y	-	Y	Y
E	Aide6	Y	Y	-	Y	Y	Y	Y	-	Y	Y
D	Recre.	Y	-	Y	Y	-	Y	Y	-	Y	Y
D	Clerk	Y	-	Y	Y	-	Y	Y	-	Y	Y

Notes: Under the heading *Staff* the first column indicates the shift worked, an E being evening shift (1500-2300 hours) and D the day shift (0800-1500). Status is in the next column: R.N., registered nurse; Aide, nursing assistant; Recre., recreation staff; and Clerk, ward clerk. The Ys in the body of the table signify the caregivers' response to questionnaire Item 1 indicated that the SDAT participant was considered a wanderer. The dashes signify a no response.

Did any single caregiver classify the participants correctly when judgements were compared to the behavioural analysis? The answer is no, however, Nursing Aide 2 misclassified only one participant (N) according to the behaviourally based classifications. Although researchers have frequently relied on the head nurse or several medical personnel to classify wanderers and nonwanderers, the nurses did not do remarkably better than the nursing aides. Table 13 indicates, however, that the four registered nurses were in perfect agreement on all participants. In Platt's (1980) terminology they formed a *subculture*, probably because of their medical training. The one nursing aide who agreed with the nurses' classification was the only aide with university training (BA), albeit in an nonmedical field. These more educated caregivers, however, did not make accurate judgements according to the behavioural analysis done in Study 1.

It might be argued that the behavioural analysis drew the line between wanderers and nonwanderers at too high a level of *wandering*. Support for this argument could be gained from the caregivers' classification of participants H and N as nonwanderers. Both these participants were in a subgroup of wanderers in the behavioural analysis, however, *they were significantly more similar to other members of their subgroup than they were to the nonwanderers* (cf. G^2 analyses in Study 1). Therefore, it seems unlikely that the nurses' errors in classifying participants could be attributed to their using a different criterion level than was applied in the behavioural analysis.

Behavioural Results and The Wandering Index

When caregivers answered a number of questions and thus were permitted a greater range of scores for their evaluations of each participant it was anticipated that they would distinguish three categories of wanderers. This expectation was derived from the fact that the chi-square analyses in Study 1, that were based on behaviours frequencies, partitioned the participants into three classifications. Two participants were found to exhibit significantly less wandering and two were found to exhibit significantly more wandering than the six others. The indices in Table 14, derived from the Likert-scale items of the questionnaire, showed no evidence, however, of three groups. If caregivers had noticed the two excessive wanderers, then those two should have had higher indices than other participants, but even the one who spent approximately double the time in restless locomotion as the next most active participant, apparently was not remarkably different to individual caregivers. Neither of the excessive wanderers were ranked consistently at the top by the individual caregivers.

Similarly, the two participants classified as nonwanderers in the behavioural analyses in Study 1 were not consistently ranked last by individual caregivers. The smaller indices for these participants, however, suggested that caregivers viewed these participants differently from others in spite of classifying them as wanderers. The uniform size of the indices in the columns indicates the SDAT participants received similar assessments from different caregivers.

Table 14

WANDERING INDEX FROM CAREGIVERS' RATINGS OF SDAT PARTICIPANTS

SDAT Participants

Staff	G	H	L	M	I	P	E	N	S	T
R.N.1	27	**9**	**13**	33	**14**	30	27	**12**	34	25
R.N.2	26	**16**	**16**	30	**14**	33	27	**24**	29	26
R.N.3	30	**17**	**13**	28	**18**	28	35	**14**	33	24
R.N.4	27	**15**	**14**	32	**12**	31	27	**18**	18	21
Aide1	27	**15**	**13**	27	**14**	26	29	**15**	26	20
Aide2	35	11	**12**	33	**13**	36	32	**13**	36	25
Aide3	27	**18**	**9**	32	17	25	31	**16**	27	29
Aide4	29	**20**	14	38	**16**	29	28	**14**	41	26
Aide5	28	**11**	**6**	27	**15**	28	28	**13**	33	30
Aide6	31	20	**11**	36	16	29	27	**19**	36	26
Recre.	26	**15**	11	28	**13**	29	29	**14**	23	26
Clerk	38	**17**	9	41	**12**	37	32	**13**	36	21
Average Index	29	15	12	32	15	30	29	15	31	25
SD	3.8	3.5	2.7	4.5	1.9	3.7	2.6	3.4	6.5	3.1

Notes: To facilitate comparisons with Table 13 the indices are in boldface in Table 14 if the caregiver said the participant was a wanderer. Total scores could range from zero to 52. Actual scores ranged from 6 to 41. R.N. indicates registered nurse; Aide, nursing assistant; Recre., recreation staff member; and Clerk, ward clerk.

The indices' size did *not* reflect the individual caregiver's answer to questionnaire Item 1 that asked for caregivers to judge whether the participant was a wanderer or not. For example, the nursing assistants who said several participants were wanderers (cf. Table 13, participants H, L, and I), nevertheless, answered the Likert-scale questions in such a way that the indices were no higher for these participants than the indices produced by caregivers who said the participants were nonwanderers (cf. Table 14). Figure 5 illustrates the relationship between the indices for each SDAT participant averaged over all caregivers (cf. Table 14) and the odds ratios for individual participants from Study 1.

The odds ratio is a measure of association commonly used to express the probabilities of two mutually exclusive events. In this case the odds for each individual SDAT participant are those of being observed exhibiting wandering events rather than nonwandering events during Study 1. In Figure 5 notice that the odds ratios for two participants of 0.32 and 0.29 (for H and N, respectively), place them among four other participants with very similar odds ratios (0.35, 0.41, 0.47, 0.47). However, participants H and N were classified as nonwanderers by the caregivers, and therefore, they are depicted as being similar to participants L and I (whose odds ratios were only 0.11). The regression line that best fits the data in Figure 5 indicates the association between the behavioural measure represented by the odds ratio and the caregivers' assessments is not linear, rather it is loglinear. A a second degree polynomial equation best predicts the relationship (i.e., mean index score - 6.125 + [61.465 + 35.632 (odds ratio)]*(odds ratio)). Although the multiple R^2 is a respectable .687 (*p* .01, *N* 10) the loglinear relationship between the measures suggests that Pearson correlations (measuring linear

Figure 5. The Wandering Indices that are based on the caregivers' evaluations of SDAT participants' wandering behaviours, plotted against the odds ratios, that express the frequency of wandering events to nonwandering events based on the behavioural observations of Study 1.

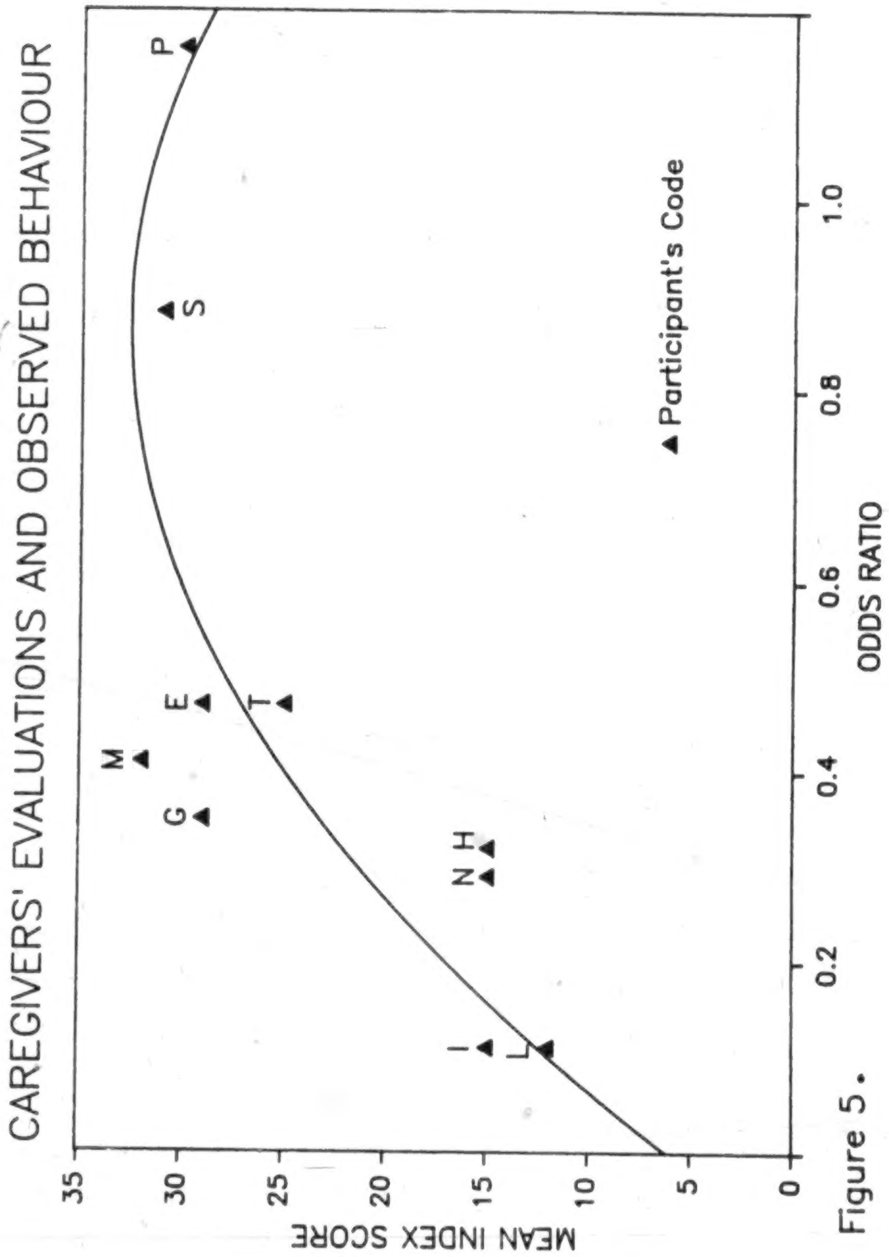

CAREGIVERS' EVALUATIONS AND OBSERVED BEHAVIOUR
MEAN INDEX SCORE
0
5
10
15
20
25
30
35
ODDS RATIO
0.2
0.4
0.6
0.8
1.0
▲ Participant's Code
I
L
N
H
G
M
E
T
S
P

Figure 5.

relationships) will not adequately measure the loglinear relationship that can be expected between questionnaire items about particular behaviours and observations of those behaviours.

The loglinear relationship also suggests that caregivers see participants as being wanderers or nonwanderers, even when a series of questionnaire items presents them with an opportunity to scale their assessments rather than make a dichotomous judgement. Should the researcher conclude that an index based on a questionnaire is no better than a yes/no question? Both test theory and the indices of agreement in the next two sections suggest the better strategy is an index based on a number of questions.

Classic Test Theory

The average index scores for each participant would be anticipated to be more accurate measures of the participants' behaviours according to classic test theory. "This theory holds that a test score, *x*, has two additive components, an error component, *e*, representing variable error in a person's test responses, and a true component, *t*, representing the person's true score, devoid of random error." (Green, 1981). One assumes that parallel tests, such as the one completed by each caregiver for a particular participant would have the same *true component* but different *error components*. Therefore, parallel tests converge on the truth about a participant's wandering but each individual item and each caregivers' contribution will not be as accurate as all items and all caregivers. This suggests that the questionnaire is better than a single question and strongly suggests that many informants are superior to a single informant.

Indices of Agreement

Validity of a screening questionnaire or diagnostic test is usually assessed by constructing a 2x2 table and calculating the indices of agreement with a criterion measure (Fleiss, 1981; Williams, Hand & Tarnopolsky, 1982). The indices of agreement in Table 15 use the behavioural observations as the criterion. The high false negatives and false positives rates in the upper half of Table 15 reveal the caregivers' inability to differentiate wanderers from nonwanderers, when asked to categorize them by a single question.

Table 15

INDICES OF AGREEMENT

BETWEEN OBSERVATIONS & CAREGIVERS' JUDGEMENTS

		Wanderers	Nonwanderers
Caregivers' Y/N Rating	Wanderers	74	6
	Nonwanderers	22	18

Sensitivity (Se) = 74/(74+22) = .77
False negative rate (1-Se) = 22/(74+22) = .23
Specificity (Sp) = 18/(6+18) = .75
False positive rate (1-Sp) = 6/(6+18) = .25
Positive predictive value (PPV) = 74/(74+6) = .93
Negative predictive value (NPV) = 18/(22+18) = .45

		Wanderers	Nonwanderers
Questionnaire	>16	82	14
Index	≤16	5	19

Sensitivity (Se) = 82/(82+5) = .94
False negative rate (1-Se) = 5/(82+5) = .06
Specificity (Sp) = 19/(14+19) = .57
False positive rate (1-Sp) = 14/(14+19) = .43
Positive predictive value (PPV) = 82/(82+14) = .85
Negative predictive value (NPV) = 19/(5+19) = .79

Consequently, the sensitivity and specificity indices are correspondingly poor. The predictive values are the most important indices for researchers who rely on caregivers' judgements to select subjects. The positive predictive value (PPV) is the probability that a screened positive, that is, a participant who has an above-threshold score on the screening questionnaire, is actually a case. Thus, the PPV of 0.93 indicates that 100 high scorers will contain 93 cases and 7 persons who are misclassified. The NPV is the probability that a screened negative, that is, a participant who has a below-threshold score on the screening questionnaire is not a case. Thus the NPV of 0.45 indicates that 100 low scorers will contain 45 normals and 55 misclassified low scorers.

One can conclude that the caregivers' answers to the yes/no question were adequate for identifying wanderers, but were not reliable for establishing who did not wander. The PPV was high but there was a false positive rate of .25. It should be noted, however, that *both the PPV and the NPV are dependent upon prevalence* (cf. Table 15 formula). It can be shown that PPV decreases sharply when the prevalence drops below 20% (Williams et al., 1982). Thus researchers should be cautioned about using this strategy in general nursing home populations where the prevalence of wanderers is typically below 20% (Blasch, 1988; Dawson & Reid, 1987; Hiatt, 1988; Mann et al., 1984; Meacher, 1972).

In the lower half of Table 15 the questionnaire index, based on items 2-12, 14 and 16, is evaluated. A score of 16 was used as cutoff because the indices of agreement, particularly the PPV and NPV, were better balanced with 16 that with other possible cutoff scores. The indices of agreement show that asking a number of questions produces better results than a single question although improvements are still needed because the false positive rate and specificity are still inadequate. Multiple items are not the equivalent of behavioural observation but the cutoff score was statistically determined and may not be the best choice.

Interrater Reliability

Surprisingly, the four nurses who were in complete agreement about who was and who was not a wanderer, did not agree on their answers about each of the SDAT participants. The interrater reliability on the answers to Items 2 to 12, 14 and 16, was nearly identical for nurses and nursing aides (.65 for nurses, .64 for nursing aides, kappa statistic, Cohen, 1960). For neither group was agreement at the .80 level that was desired. The discrepancies in caregivers' answers could not be attributed to the preference of some for mid-range answers on the Likert scale while others preferred extreme answers. If discrepancies were due to the level of answer chosen then the rank order of the participants should be similar across caregivers. When the rank order of each of the participants' indices (cf. Table 14) is examined, however, the ranking is not similar across caregivers. For example, scanning across the rows for the four nurses it is evident that four different participants received the highest index score given by each nurse. Further examination reveals few similarities in the ranking of participants by the caregivers.

The Definitions of Wandering

Each caregiver was asked to define wandering at the beginning of the interview, before the nature of the subsequent questions was revealed. The caregivers' definitions, therefore, should reflect their own ideas rather than behaviours the researcher considered relevant to the concept of wandering. Examination of the behaviours the caregivers used in their definitions determined, however, that they could be grouped into the types of wandering behaviours observed in Study 1. That is, the caregivers listed much the same group of behaviours in their definitions that were used in Study 1 to operationalized wandering. Table 16 lists the behaviours that caregivers initially mentioned when asked to define wandering but some *informal* definitions are listed too. Caregivers were also asked to give their rationale, for each judgement of an SDAT participant, when they answered Item 1. Thus, they provided additional criteria, which varied from decision to decision, for distinguishing wanderers from nonwanderers. Because caregivers used these criteria in making their judgements, the additional criteria were considered to be *informal* definitions. Table 16 includes these if the criteria did not appear in the caregivers' original definition.

Just as caregivers added criteria to their original definitions by providing reasons why they classified particular participants as wanderers, they similarly provided additional reasons for excluding participants from the classification. The exclusionary criteria listed by caregivers for those participants whom they classified as nonwanderers are presented in Table 17. Criteria from both Table 16 and Table 17 will be discussed in considering the meaning that caregivers attributed to *wandering*.

First, did caregivers' formal definitions of wandering influence how they answered particular items? Just as there was no indication that their answer to Item 1 influenced their answers to subsequent items on the questionnaire, there is no evidence that their definitions influenced their answers. For example, caregivers who did not include excessive walking in their definition did not give lower scores on items related to excessive walking, nor did those who included searching in their definition award higher scores on the item that dealt with searching.

Table 16

CAREGIVERS' DEFINITIONS OF WANDERING

	ABSCONDING	NAVG. DIFFIC.	LOCOMOTION
R.N.1	They may wander outside.	--	Wander in halls. Can't be confined to any one area.
R.N.2	Will leave the floor, even the building.	--	*G-Walked up and down halls.
R.N.3	Will wander outside.	--	Constantly walk.

R.N.4	*N-Would walk into elevator if it was open.	--	Constantly walk.
Aide1	*E-Absconded to highway from another home.*	*Most (participants) returned to locations accidentally.	Must be allowed to walk, settle down.
Aide2	--	--	*G, P, E, S & T-Walked halls.
Aide3	--	--	Walk up and down the halls most of the time.
Aide4	Never know where to locate them.	--	Constant walking. Always on the move.
Aide5	--	Seem disoriented.	Walk up and down halls. Seem restless.
Aide6	May leave the floor.	*N-Would Follow people and get lost.	*P-Walked aimlessly.
Recr. Staff	--	--	Restless, "on the go".
Ward Clerk	--	--	They walk, thinking they are going some place (can't be diverted).

	FIDDLING	SEARCHING	TRESPASSING
R.N.1	*E-Fiddled with things.	*S-Searched for absent wife. *E-searched little.	May enter the rooms of others'.
R.N.2	*T-Gathered things, like cups. *S-"Measured" woodwork. *N-took things.	--	No sense of other's privacy, constantly intrude.
R.N.3	--	*N-Looked but didn't know what for. *E-Looked for something to do. *T-Looked for company.	Go into others' rooms, into inappropriate places.
R.N.4	*S-Pushed and stacked chairs.	*T-Looked for companionship. *P-wants more space.	*E-Goes in others' rooms, through their things.
Aide1	--	Search for own people, own furniture.	*N-Walked on every wing and sat anywhere.
Aide2	Pick up articles, hold onto articles.	*N-always looking for something. *N-always	Always opening and closing residents' doors. *P & S-

		searching.	Took others' things.
Aide3	--	**Look for social company.**	--
Aide4	--	--	--
Aide5	--	--	--
Aide6	--	*M-Searched for family and male companionship. *E-Searched for male company.	*M-Walked anywhere (disregarded social and physical barriers).
Recr. Staff	--	**Look for social company.**	--
Ward Clerk	*T-Irritated by things out of place, so moved them. *S-Had to hands keep busy.	**Look for something to do; want to be with people.**	--

Notes: *Designates criteria caregivers used for judging wanderers that were not included in caregivers' definitions of wandering, but were added as they described why particular SDAT participants were wanderers. Participants' codes (G, H, L, M, I, P, E, N, S, & T) precede the new criteria to indicate which participant was being discussed. Boldface items were original definitions.
[+] A comment that demonstrated some caregivers used information (in making their judgements of SDAT participants) that predated the period they were asked to recall.

Table 17

CAREGIVERS' REASONS WHY SDAT PARTICIPANTS

WERE NOT WANDERERS

	ABSCONDING	NAVG. DIFFIC.	LOCOMOTION
R.N.1	N*: stayed on the wing. N: was rarely at nursing station.	N: needed guidance to lounge and room.[+]	L: only walked the halls when following others. I*: was prevented from walking by arthritic pain.

R.N.2	N: was never out of D-wing. N: no interest in being off the wing.	L: was terrified of being off the wing when unaccompanied.	I$^+$: was prevented from walking by arthritic pain.
R.N.3	N: seldom at around nursing station. N: stayed in D-wing to walk.	N: always seemed to know her room.	I$^+$: just sat--arthritis.
R.N.4	I: never went anywhere but lounge and room. L: no instigator of leaving D-wing. N: would follow others to nursing station.	--	N$^+$: didn't walk because of discomfort.
Aide1	--	--	N: and N: only walked the halls occasionally. I: sat most of the time.
Aide2	N: always stayed within the wing.	--	I: always seemed to be sitting. L: --walking was purposive.
Aide3	N: usually stayed on wing. N: just walked between her room and the lounge.	--	N: would walk behind another but didn't lead. L: followed others, but just from boredom. N: followed a group.
Aide4	--	--	N: may have been taken walking by another (but didn't lead).
Aide5	N: stayed in her room. N: stayed in her room, didn't like the halls.	L: knew own room, knew where she was on the ward (other wings).	I$^+$: had low mobility because of arthritis.
Aide6	N: stayed on the wing, only leaving it with staff.	--	L: --all her walking had a purpose.
Recr. Staff	N: was content to remain where she was, not curious.	--	I: was only out of her chair for a purpose. N: walked only when she had a purpose.
Ward Clerk	N: seldom at station. N: rarely at station, even if asked to wait there was to restless to stay.	--	I: has stopped, used to walk/wander like the others.

	FIDDLING	SEARCHING	TRESPASSING
R.N.1	--	--	--
R.N.2	--	--	--
R.N.3	--	L: needed to be with people--was too afraid (to seek people beyond those found in D-wing).	--
R.N.4	--	L: was searching for companionship if she left wing.	--
Aide1	--	L: looked for things to do but always had a reason.	--
Aide2	--	--	--
Aide3	--	--	--
Aide4	H: usually just fiddled with things in her room.	--	--
Aide5	--	--	--
Aide6	--	--	--
Recr. Staff	--	H: walked around when she was looking for something.	--
Ward Clerk	--	--	--

Notes: * Single letter codes were used to designate participants (H, L, I, and N).

+ Some caregivers attributed their classification of Participants H and I, as nonwanderers, to the arthritic pain the participants suffered.

In reviewing the behaviours cited in caregivers' definitions, the most frequently mentioned was excessive walking or walking in the hallways. References to excessive walking appeared in 9 of the 12 definitions, whereas absconding appeared in five, and trespassing and searching were both mentioned in four. Navigational difficulty and fiddling were each mentioned by only one caregiver. Most caregivers cited two of the wandering behaviours in their definitions but one nurse cited only excessive walking and one nursing aide mentioned only absconding. The ward clerk who often found herself entertaining wanderers at the nursing station emphasized the SDAT participants need for social companionship.

Only two components of the caregivers' definitions of wandering did not fit under the headings in Table 16. The recreation staff member mentioned that wanderers had a shorter attention span, an observation that was not surprising considering her concern with maintaining their attention during her projects. As well, an aide suggested that wanderers seemed more confused than nonwanderers.

The behaviours marked with asterisks and participants' codes in Table 16 were the additional behaviours cited as caregivers made their judgements regarding individual participants. These behaviours were not components of their original definitions. Caregivers evidently varied their criteria as they decided whether each participant was a wanderer or not. All the items in Table 17 were additional criteria provided in explaining why particular participants were not wanderers. Here too, different criteria were used for different participants. For example, navigational ability was mentioned in only one caregivers' definition (Table 16) but it was given by four caregivers as a reason why some participants were not wanderers (Table 17). The use of different criteria for different persons is consistent with other studies that have examined caregivers' judgements about their patients (e.g., Gilleard & Rizvi, 1980 cited in Gilleard, 1984). Gilleard and Rizvi found nurses varied the number of criteria they used (from 1 to 6) and the same nurse would vary which criteria she used from patient to patient. Such practices are a major problem for researchers relying on caregivers' classifications to select subjects for a study (see also, Platt, 1980).

An examination of various reasons in Tables 16 and 17 that caregivers gave for making their judgements about participants suggested they attempted to rationalize participants excessive walking. Searching for companionship was frequently given as a reason for locomotion even though the behavioural data suggested wanderers were less sociable that nonwanderers. However, searching was given as well to explain why some participants were not wanderers. The rationale apparently was that one participant was not a wanderer because she was only looking for company if she was found at the nursing station, but another participant was a wanderer because she was frequently out at the nursing station looking for companionship. The use of searching in this way was surprising because caregivers typically answered the questionnaire item concerned with searching in a way that indicated participants were seldom seen searching.

Another apparent inconsistency arose from several caregivers suggesting that two of the participants did not walk the halls because of arthritic pain, although another participant was said to walk *because of* pain. The latter received analgesics, the former did not. The reasoning in the latter case was that pain prevented her from sitting still. Consider, however, that when her legs became so swollen that she was confined to a geriatric chair to reduce her walking, she would immediately began walking again when she was released, although presumably she had less discomfort because the swelling in her legs had diminished. The caregivers' rationale with respect to pain and walking would not necessarily be inconsistent, of course, if the SDAT participants had provided the rationale but it is difficult to determine how caregivers would arrive at such conclusions given the verbal capabilities of the participants.

The behavioural data indicated that all of the participants walked the halls alone as well as engaging in group walking. The rationale provided by caregivers indicated they readily discounted substantial amounts of *aimless walking* if they felt the participant was following others and had not instigated the action. For this reason three caregivers said participants L, H, and N were not wanderers (Table 17). However observers, whose only task was to watch the participants, had great difficulty in determining who instigated group walking on the occasions on which it was seen.

The Questionnaire

One reason for discrepancies between behavioural observations and questionnaire results (cf. Figure 5) may be due to the use of frequency measures as the criterion for judging the adequacy of the caregivers' evaluations of the participants. Caregivers may have based their judgements on time based measures rather than frequencies. There is some evidence of this in Table 16 and Table 17. Definitions that include phrases such as "constantly walk",

"walk up and down the hall most of the time", "sat most of the time", and "holds onto articles" suggest caregivers are sensitive to the durations of some behaviours, whereas "pick up articles", "always opening and closing residents' doors" and "will leave the floor" suggest frequencies of momentary events were also noticed. While a caregiver was answering questionnaire items she may have thought, "I have to spend *so much time* looking for M...the extreme answer is best." If the answers regarding absconding, for example, were based on this type of rationale, then the frequency measures would not be expected to correlate with the items, because frequencies showed absconding was very rare. Unfortunately, the questionnaire items were not worded unambiguously in a way that they consistently encouraged the caregivers to think in terms of frequencies rather than durations. Items, therefore, could be improved by making them explicitly seek either frequencies or durations from the caregivers.

Another reason why the agreement between behavioural observations and questionnaire results is not better may be because the questionnaire is basically inadequate for the purpose intended, but an item analysis to statistically determine adequacy is difficult. Because each of the 12 caregivers answered the questionnaire for the same 10 SDAT participants, the resulting data matrix is unlike the matrix customarily used in statistically analyzing a questionnaire. Normally one finds the data for a subject represented only once in the matrix rather that 12 times. The redundancy introduced by having 12 variations of the data for 10 participants, which is a very small population for a psychometric analysis, makes the usual analysis dubious. It is difficult to know how to interpret statistics such as split-half correlations, Cronbach's alpha, and reliability indices for each item from this type of data.

Even without such an analysis, however, some suggestions for improvements can be made. Considering that caregivers paid considerable attention to trespassing, in spite of the fact that trespassing was rarely seen, it could be argued that the questionnaire could be improved by limiting the items to behaviours that are apt to cause disturbances. Certainly, caregivers appeared more knowledgeable when questioned about behaviours that had a potential for disturbing caregivers' routines, such as, absconding from a room, or for disturbing higher functioning residents, such as, trespassing and walking incessantly in the hallways. As well, caregivers were apt to disregard behaviours that occurred primarily on the special wing, thus they were inaccurate in rating participants that caused few disturbances, the nonwanderers. The variability of caregivers' suggests that researchers who use caregivers' ratings to make their subject selection would help others evaluate their work if they reported in detail what criteria were used or precisely what questions were posed to the caregivers.

Conclusion

Although two methods were used to solicit judgements from caregivers about the wandering behaviours of the SDAT participants neither produced trustworthy results in differentiating wanderers from nonwanderers. That is, neither direct questioning nor the indices derived from multiple questions achieved the classification of the participants into the groups identified by the behavioural analyses in Study 1. Thus the overall conclusion is that neither the single direct question nor the index scores would be viable methods for selecting nonwanderers and wanderers.

On a more positive note, however, the strategy of pooling the caretakers answers to multiple questions, thus obtaining average index scores for each participant, appeared to be a good method of assessing the participants' behaviour. A loglinear analysis indicated the relationship between the caregivers' reports and the behavioural observations was comparatively good, but it was not linear; caregivers' tended to make a dichotomous judgement about wanderers even when they could have used a broader scale. Pooling the results, rather than considering individual caregivers' answers would be a viable way, therefore, to conduct a retrospective study of wandering. However, as Platt (1980) warns retrospective reports can seldom be verified in any satisfactory way. Therefore, the researcher is still left with the problem of verifying the data. In order that the pooled information will converge on the true behaviour of a subject, how many caregivers should the researcher include in a survey? Platt (p. 580, 1980) presented evidence to show that across-interview agreement is not a satisfactory test of validity. "Whether it can be sufficiently improved to constitute an acceptable *sole* procedure for validating objective data must remain open to doubt....High across-interview agreement between accounts should not be considered a sufficient or adequate basis for claiming the validity of a measure based on these accounts, unless the latter are truly independent. Simultaneous interviewing of informants does not necessarily guarantee the independence of their accounts. When both informants come from the same subculture, independence of experience and perception should not be presumed but must be proven."

The inclusion of different caregiver subcultures, as recommended by Platt (1980), is very likely an important part of the success achieved through pooling the results. As a group, nurses were more consistent in their judgements than nursing aides (not *right*, just more consistent), therefore, if only the nurses data had been pooled the results may have been little better than the results from one nurse. The ward aide and recreation staff member also added unique perspectives, as their definitions of wandering evidenced.

A major concern is the evidence (from caregivers' definitions) that caregivers provided a variety of reasons, which changed according to which SDAT participant was being considered, for their classification of participants. This provides a good reason why a researcher should not rely on a single item to classify subjects, but should provide explicitly provide the criteria on which judgements should be based. Additionally, in each question that is asked the researcher should not leave caregivers to their own devices in deciding what evidence to use to guide their answers. Items should be explicitly worded, for example, in order to guide caregivers in the use of frequency or durational evidence if the researcher expects the results of a questionnaire to correspond with particular behavioural measures. Unless the wording induces the caregiver to focus on frequencies of behaviours (or durations, if that is preferred), the caregiver may focus on frequencies in answering one item and durations on another.

Another problem was the inconsistencies. For example, caregivers suggested that participants walked the hallways because they were searching for company or for family members, but when asked if participants gave the impression they were searching for something or someone, the caregivers indicated they seldom received that impression. This discrepancy was difficult to understand. It seemed as though the caregivers used searching as an construct to *explain* excessive walking but because they did not observe the behaviour of searching they did not employ the term in their *description* of wanderers.

Study 3

The possibility of demented residents absconding from their nursing homes is a growing concern (Blasch, 1988; Branzelle, 1988; Rouse et al., 1986; Staff, 1987; Stilwell, 1988). Hiatt (1985) found that 66.1% of nursing home directors that she surveyed regarded wandering as a current problem. In the three months prior to the survey, 94.6% of the 170 facilities had a patient abscond inside the building or abscond from the building and 81% had had a patient abscond from the building.

In spite of the fact that the caregivers in the present nursing home had earlier indicated that absconding was an everpresent concern, the systematic observations in Study 1 indicated that absconding from the nursing home did not occur. Although observers were aware such events happened (absconding from the facility was seen in Study 4), the data contained no incidents because they occurred at times when the absconder was not being observed by the coders. The data also indicated that absconding from the second floor to a lower one occurred much more infrequently than caregivers had implied. The discrepancy between the caregivers' reports and the results of Study 1 were difficult to reconcile. However, statistics from Hiatt's (1985) survey suggest this is not a paradox; instead the caregivers' reports and the results of Study 1 represent two perspectives on the problem. From the caregivers' perspective absconding would appear to be a frequent occurrence, given that Hiatt found 81% of the facilities had had a patient abscond from the building during a three-month period. However, Hiatt's survey also reported that the number of patients who absconded from the nursing homes during that three months was small, averaging 2.4 absconders per facility. Thus from the perspective of the individual resident absconding is a rare occurrence and, therefore, it was not surprising that it was not observed in Study 1.

The surprise resulted from the fact that coders were aware that absconding from the building did happen occasionally, but it did not occur during any of the 600 10 minute observational periods which comprised the data for Study 1. When incidents of absconding from the building occurred the observers were, by chance, with another participant and were not watching the absconder at the time of the event. This happened because systematic observations, which statistically sample behaviour as it occurs in time, require that observers follow a sampling schedule and do not permit them to add *ad libitum* observations to the data set (*ad libitum* scheduling is generally considered unacceptable, see Lehner, 1979). Thus, in Study 1 participants were observed in a semi-randomized order for specific periods of time and observers were not free to investigate even if they saw a resident leaving the floor, unless it was the person they were assigned to watch at that particular time.

Given that absconding from the building occurred, although it was not directly observed, one can conclude that the number of observations were not sufficient to allow direct observation of the event. One can then ask, how many observations would be necessary? Bakeman and Gottman (1987) discuss a formula intended to help investigators determine, before data collection, how many data points need to be coded. However, the formula is useful only for studies conducted to confirm hypotheses that are based on other observational data. The key piece of information for the formula is the expected probability for the least frequent behavioural sequence. That makes the formula of little use, unfortunately, to researchers investigating topics on which there is no previous observational data. Therefore, although it can be concluded that not enough behavioural transitions were recorded in which absconding was one of the behaviours, it cannot be estimated how many would be necessary. Consequently, until more observational information on absconding from the building is obtained it will be difficult to estimate the number of behavioural sequences that are required for a reliable behavioural analysis of absconding from a facility. That is, *some* data must be obtained before satisfactory data can be collected.

To obtain a more accurate assessment of the problem of absconding in the present nursing home it was decided to approach the problem from the caregivers' perspective. Instead of attempting to determine the participants' rate of absconding, a count was made of all the absconding incidents and the data were related to other information that was available about the absconder. Therefore, this study reports the absconding incidents that occurred throughout the time the observers were in the nursing home conducting the observations for the pilot study, Study 1 and Study 4 of this dissertation.

The count was relatively easy to obtain. Absconding incidences, when they happened, were so remarkable they typically precipitated several types of comments: announcements over the public address warned that a resident was missing from his or her ward; staff discussed any episode that concluded with a resident being found in a surprising location (i.e., found on another floor or outside the building); and staff *sometimes* noted incidents in written records. Because these events had a potential for influencing the environment on the special ward where the SDAT participants lived, these absconding incidents became part of the written records that observers kept while they were conducting the various studies. Thus, although the count of absconding incidents was *post hoc*, records from which the count is based were made at the time the incidents actually occurred. Typically, at least one observer could verify incidents of absconding from the building or absconding from the floor that occurred throughout the three month period during which these records were kept, thus the count made for this study was not dependent on records maintained by staff.

Some potentially important information emerged during the count of incidents. First, more individuals from the special wing were involved in absconding incidents than was anticipated, based on the average in Hiatt's (1985) report. Additionally, persons who were frequently engaged in restless locomotion were not the only residents to abscond. Those who seldom engaged in restless locomotion also absconded. All of the absconding events on the wing had been recorded, not just those of the SDAT participants in Study 1, because of the potential these incidents had for disturbing the environment of the SDAT participants. However, to include all of the absconding incidents in these data, it was necessary to obtain information on the residents of the special wing who had not been participants in Study 1. The only information that was analogous to the information about the SDAT participants was some pilot data for the Wandering Index, the questionnaire discussed in Study 2 (Appendix H). Although the questionnaire was an imperfect assessment tool, it was used because of the lack of better information. Consequently, additional analyses were done to judge the effect of the misclassification of participants by the questionnaire.

The value of this report lies in the fact that no study has yet established a relationship between the behaviour of excessive, and seemingly purposeless locomotion, and absconding from institutions. Although logic may argue that restless locomotion leads to absconding and the more locomotion the higher the probability of absconding, there seems to be no direct evidence for this. As noted in the introduction to these four studies, treating this assumption as fact has led to extensive use of physical and chemical restraints with demented persons.

Method

Subjects and Subject Classification

From the population of 22 persons who lived on the special dementia ward, 20 persons were selected. Ten of these were the SDAT participants of Studies 1 and 2 of this dissertation. The other 10 had various diagnoses but medical records indicated that all suffered from dementia. One of the two others had SDAT but could not walk, the other was a long-time resident of the ward, with schizophrenia, who did not wish to move when the dementia unit was established.

The group of 20 residents contained 11 wanderers and 9 nonwanderers based on ratings from the questionnaire. That is, 11 persons were classified as wanderers by the answer to the item of the Wandering Index that asked for a dichotomous classification (cf. Study 2 and Appendix H). It was not possible to base the classification of wanderers and nonwanderers on behavioural data because no observational data were available for the 10 residents who were not participants in Study 1. The questionnaire investigated in Study 2 could be used, because assessments of all persons on the special dementia ward had been done in the pilot research for the questionnaire. Thus the questionnaire, not direct observation, provided equivalent ratings of the extent to which all 20 persons were engaged in the wandering behaviours. The 10 individuals who were not SDAT participants in Studies 1 and 2 were rated by the nursing home's psychiatric nurse and the researcher (items were those in Appendix H). A problem that resulted from using the questionnaire to differentiate wanderers from nonwanderers was that SDAT participants N, H, L and I were classified as nonwanderers by the caregivers, although the behavioural analysis in Study 1 suggested that both N and H engaged in sufficient wandering behaviours to be part of the main group of SDAT wanderers. As well, H and N had average index scores on the questionnaire of 15, which was below the arbitrary cutoff score of 16 used in the analyses for Table 15, whereas other wanderers had average index scores greater than 25, and the nonwanderers had average index scores of 15 or less. Because of this an analysis was done with a second grouping of the 20 residents in which N and H were considered wanderers (i.e., wanderers then totaled 13 and nonwanderers 7).

Procedures for Measuring Absconding

A count was made of the incidences of absconding from the building, as well as from the second floor to a lower floor, for each of the 20 residents. References to such incidents were found in records kept by observers during the main study and the pilot study. Observers had recorded these incidents as they occurred throughout a three month period, noting what they heard or read in a daily log or on the notations made during an observation (the latter were clearly identifiable as not pertaining to the current observation). All of the incidents of absconding from the floor that were observed throughout the three months, including the four noted in Study 1, were included in the count. The one occasion on which a participant could not be found when he or she was to be observed (i.e., the participant was missing for 10 minutes; cf., Dawson & Reid, 1987), was counted as absconding from the floor because a thorough search was made of the floor for the participant (this was not part of the data used in Study 1).

Results

The absconding incidents that involved the participant leaving or attempting to leave the nursing home are presented in the top graph of Figure 6. The total number of persons absconding from the building, included 2 wanderers and 3 nonwanderers and each person absconded only once. The total number of persons absconding from the top floor are presented in the lower graph. A total of 3 wanderers and 2 nonwanderers absconded from the floor but one of the wanderers absconded twice and another absconded 4 times (i.e., there were 7 instances). However, the unit of analysis was the individual not the behaviour. A likelihood ratio chi-square test disclosed that there was no significant difference between wanderers and nonwanderers for either type of absconding (for absconding from the building G^2 0.61, *df* 1, $p=.44$; for absconding from the floor G^2 .07, *df* 1, $p=.80$).

Figure 6a. The incidents of absconding from the building committed by residents of the special dementia wing plotted against their status as wanderers.

Figure 6b. The incidents of absconding from the second floor of the nursing home (to a lower floor) for residents of the special dementia wing plotted against their status as wanderers. A likelihood ratio chi-square test disclosed that there was no significant difference between wanderers and nonwanderers for either type of absconding (for absconding from the building G^2 0.61, df 1, $p=.44$; for absconding from the floor G^2 .07, df 1, $p=.80$).

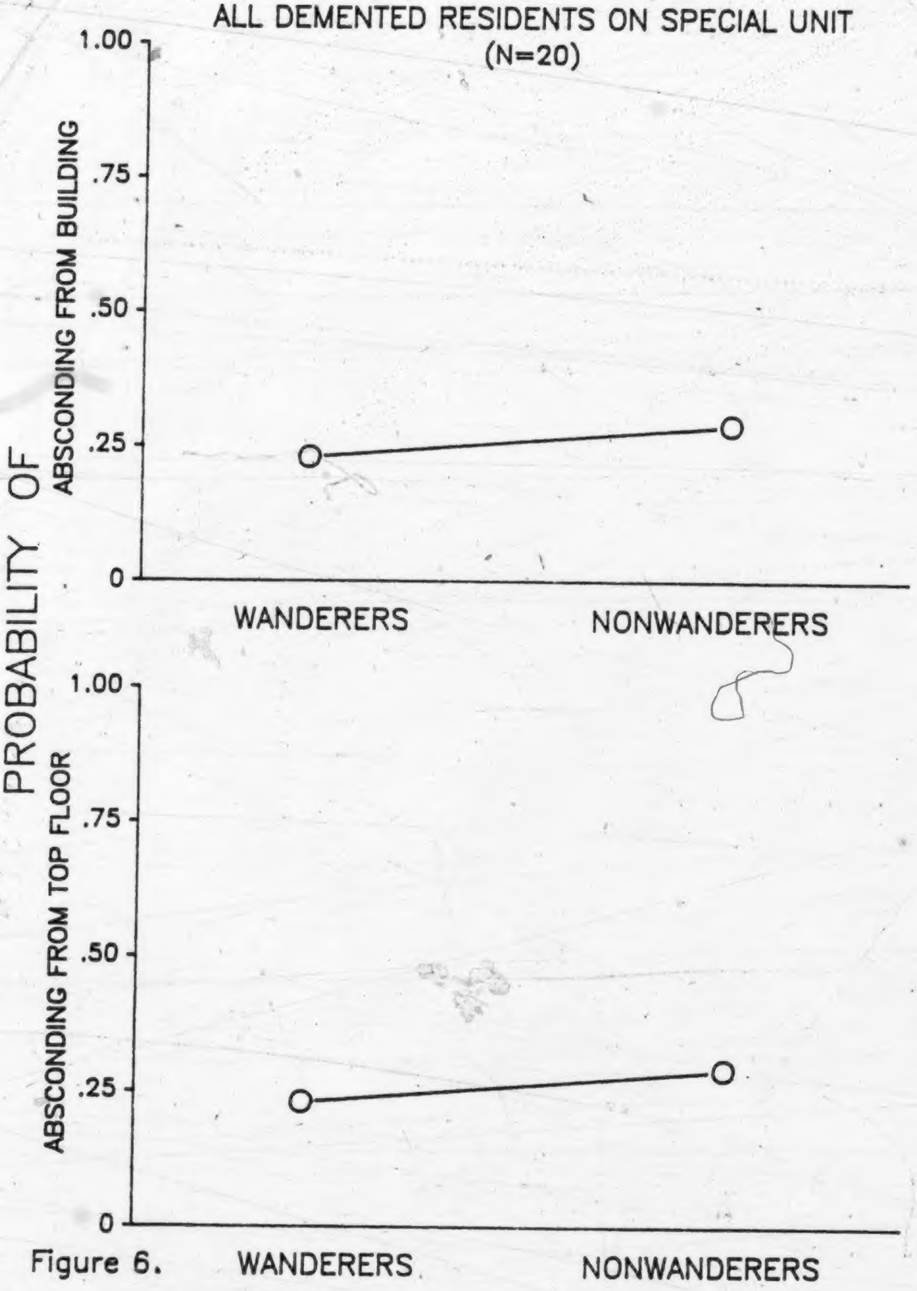

ALL DEMENTED RESIDENTS ON SPECIAL UNIT
(N=20)
PROBABILITY OF
ABSCONDING FROM BUILDING
1.00
.75
.50
.25
0
WANDERERS
NONWANDERERS
ABSCONDING FROM TOP FLOOR
1.00
.75
.50
.25
0
WANDERERS
NONWANDERERS

Figure 6.

A parallel analysis used a slightly different classification of the 20 residents. The second analysis was necessary because of a discrepancy between classifications of the SDAT participants based on questionnaire data and those based on behavioural data. In Study 2 it was found that classifications based on the nurses' answers to the questionnaire placed two of the SDAT participants with nonwanderers, whereas, the maximum likelihood chi-square partitioning of the data from the behavioural observations in Study 1, placed the two among the wanderers. The analysis reported above used the classification based on questionnaire data, thus SDAT participants H and N were considered nonwanderers. The following analysis used the classification based on behavioural data and SDAT participants H and N were considered wanderers. The status of no other SDAT participant or other resident of the special ward was altered, only SDAT participants H and N. The results, however, with 13 of the residents now being considered wanderers and 7 considered nonwanderers, indicated that the difference remained nonsignificant (results were identical for absconding from the building and absconding from the floor, G^2 .07 *df* 1, *p* .79).

There were no significant differences between the number of wanderers who left the nursing home and the number who did not engage in wandering behaviour but left the nursing home. The results are almost identical for absconding from the floor.

Discussion

Absconding from the building was a comparatively rare event if one waited for it to occur; yet it occurred frequently enough to be of great concern to caregivers. The total number of persons absconding from the building during a three month period was 5. Hiatt (1985) found that nursing homes reported an average number of 2.4 persons absconding from their facilities during a three month period. Thus this facility, with a total of at least 5 in the same time period, had double the average. The higher number may be because this report is based on observers' records and every occurrence was counted, even if the absconder was found in the nursing home grounds.

No attempt was made to calculate a *rate* of absconding for the facility because absconding events were counted only for residents of the special dementia wing and the nursing home did not document such incidents. A rate based on the fact that 5 of the 20 residents on the special wing absconded, and corrected for the population of the building (181), would not be accurate because some of the eight wings had no absconding incidents. Certainly, the wing housing the high-functioning residents had no such events. The demented residents, who might be assumed to be the persons at highest risk for absconding events, were unevenly distributed among wings and the two residential floors of the facility, although wanderers who caused problems were placed on the special dementia ward. However, this study found that nonwanderers were also at risk of absconding, therefore, it is possible that more than 5 persons absconded during the three month period, given that the lower residential floor had approximately the same number of demented persons as the upper floor. There are too many unknown factors for accurate calculations of a rate for absconding from the building.

Demented persons who were classified as nonwanderers did abscond from the building and from the floor. And most of those who were judged to be wanderers did not abscond. Consequently, the association between absconding and wandering behaviours was poor (cf. Figure 6). Identifying residents who were wanderers did not help identify absconders. This suggests that other variables play a more important role in absconding than wandering behaviours.

Although further behavioural investigation of absconding is needed, the choice of an observational method is difficult. A few calculations illustrate the problem. The frequency of absconding from the facility, based on a behavioural count, was a first step toward calculating the expected probability for this level of absconding. Not enough information was obtained, however, to determine how many focal observations, such as those in Study 1, are needed for a reliable behavioural analysis of absconding from a facility. That calculation requires an estimate of the number of transitional probabilities that can be obtained that involve absconding. However, the time based probability of absconding from the facility can be calculated and used to evaluate the feasibility of using an observational method like instantaneous scans. Instantaneous scans are analogous to spot checks on a large group of individuals (cf. Study 4 for more information).

Observers' experiences in Study 1 suggested that it was unlikely that an observer would see a resident leaving the floor or building. Such events could be as brief as 1-3 minutes. It is more likely that an observer would discover a participant was missing when it came time to observe the participant. The time frame for such a discovery is composed of two event durations. One is the time during which the absconders were missing, but no one was aware of the fact, which has an unknown duration, and the other is the time from the point at which the absconders were known to be missing until they were returned to the special ward. The latter period was estimated by two observers to vary from approximately 20 minutes to approximately 90 minutes. Thus, the minimum an absconder would be absent from the special wing was 20 to 90 minutes because the time during which they were missing but caregivers were unaware of it would be added to these minimums. If the average time was considered to be 55 minutes (20+90/2) the five incidents of absconding from the facility would have represented 4.58 hours (275 minutes) out of 960 hours (incidents occurred during the 12 hours per day observers were present and observers records covered 80 days). The time based probability then is .0047 (275 minutes/57600 minutes), which is an extremely low probability on which to base a behavioural analysis (Bakeman & Gottman, 1987). To collect information on more incidents one would have to extent the time period that observers were in the facility.

In instantaneous scans, observers average three scans per hour with each scan consuming 10 minutes, as observers gather information about each of 20 residents. If none of the absconding events were shorter than the durations estimated above, then the observers should not miss any incidents, because the time between scans is less than the duration of any incident. Recall, however, that the observer has little opportunity to notice anything except the resident's absence because the resident is off the floor throughout most of an absconding incident. Scans could solve the problem of *obtaining* data on absconding incidents, but the low time-based probability for absconding from the facility still makes the method uneconomical if four observers work for three months to collect information on 2.5 to 5 incidents. A method recently introduced by Blasch, Karp, and Martino-Saltzman (Martino-Saltzman, 1988) appears to be economically feasible. The research team installed video cameras at ward exits to gather data on attempts to leave a ward and the success of a strategy to curtail absconding.

Study 4

It has been argued that the institutional environment of nursing homes may in some way prompt residents to pace the hallways. The notion seems to be that nursing home residents walk the halls because there is nothing better to do, or because confinement in an institution makes them restless. Although no studies were found that directly support this notion, there is a large literature on the effects of institutionalization on the aged and adverse effects that have been attributed to institutionalization range from morale and psychological well being to mortality rates (e.g., Archea & Margulis, 1979; Kayser-Jones, 1981; Proshansky, Ittelson, & Rivlin, 1976; Townsend, 1962; for a review see Lawton, 1980).

The purpose of this study was to replicate Meacher's (1972) observations with respect to various wandering behaviours by drawing contrasts between the behaviours of demented and non-demented persons who have access to either the same or similar areas within the nursing home. Meacher noticed that aimless locomotion was exhibited only by severely and moderately demented residents and was not seen in cognitively alert persons, suggesting that the locomotion was part of the behavioural repertoire of persons with dementia and not a direct function of the institutional setting. He also noted that moderately demented residents engaged in more *searching* behaviours than either the severely demented (who did no searching) or the rational residents. *Fiddling* (with clothes or nearby objects), however, was exhibited to some extent by all residents, although the severely and moderately demented exhibited approximately three times the amount that rational residents did.

Instantaneous scans, a less intrusive methodology than focal observations, were used to collect behavioural data on individuals with SDAT and a group of cognitively high-functioning participants. Instantaneous scans are discontinuous time probes in which the locations and behaviours of all the participants are simultaneously sampled and recorded for a point in time. The ideal would be to have a bird's-eye-view of all locations as well as the means to record all participants' activities simultaneously, but when this is not feasible participants are observed in sequence as rapidly as possible. This observational method was used because cognitively high-functioning persons were anticipated to have a low tolerance for observation and it was not likely they would habituate to the presence of observers. Applying systematic observation to human behaviour is difficult because people do not usually appreciate having their every action noted by curious scientists, moreover, subject reactivity is a central problem (Kazdin, 1982; Sommer & Sommer, 1986; Zeisel, 1981). Even the SDAT participants in Study 1, who were expected to have such poor memories for new faces that they would not react to observers, appeared to required approximately a month before they habituated to the observers' presence.

As well as being less intrusive, the scan method has several other advantages when compared to focal time sampling. For example, because scans place lower demands on the observers' concentration, they could be intermittently spaced between the focal observations of Study 1. Additionally, more subjects, and therefore more activities and more locations, can be sampled in a given amount of time. Thus, scans have a higher probability than focal observations of detecting infrequent behaviours, such as *trespassing* and *absconding*, that are expected to have more than a momentary duration. However, they have less probability of detecting momentary behaviours such as *initiating a conversation*.

Method

Subjects

The SDAT participants were the 10 residents of the nursing home who participated in Study 1. A second group of participants were all cognitively high-functioning residents who matched the SDAT participants on one important criterion, they lived on a similar wing adjacent to the special care unit that housed the SDAT residents. Therefore, the SDAT and the high-functioning participants had parallel spaces on their bedroom wings, they were serviced by the same central nursing unit, and they had relatively the same distances to travel for the amenities that were available on the second floor of the nursing home.

The high-functioning residents were selected on the basis of recommendations by two senior staff members and an interview with the researcher to represent the most cognitively alert residents in the nursing home. The interview was conducted in two stages. In the first stage the researcher, after being introduced to a potential participant by a senior staff member, explained the research project and the need for *normal* participants to help understand demented people, requested the resident's participation in it, and provided the resident with a copy of the form she or he would sign to indicate a willingness to participate. Then the researcher left the resident "to think about *helping* us", promising to return in a few minutes.

In approximately 15 minutes the researcher returned alone and informally asked the resident about the research and whether he or she would like to sign the form. Any resident who evidenced confusion, not about the research itself, but about the earlier *visit*, was not asked to sign the form. Some residents, who were socially appropriate in their behaviour and who were recommended by caregivers as being cognitively alert, could not recall the earlier visit clearly and sometimes could not even recall the researcher.

Because high-functioning patients were a very small minority in the nursing home, there are some major differences between SDAT participants and the high-functioning participants (Table 18). Five of the high-functioning participants used wheelchairs, but they routinely propelled themselves.

The mental status questionnaire used for the study reliably differentiated (t 6.75, p <.001) the high-functioning participants (M wrong 3.2, SD 2.2) from the SDAT participants (M wrong 9.2, SD 1.6, indicating moderate to severe cognitive impairment) with the exception of one SDAT participant who had been admitted to the nursing home approximately a month and a half prior to the study. Her score was no worse than the poorest scoring high-functioning participants. However, floor effects were in evidence. Most of the SDAT participants did not provide sensible answers to the questionnaire used. The questionnaire was Pfeiffer's (1975) Short Portable Mental Status Questionnaire, with the questions about U.S. presidents exchanged for items about Canadian prime ministers.

Table 18

CHARACTERISTICS OF PARTICIPANTS

SDAT Participants

Subj. Code	Memory Problems	Age	Gender	First/Other Languages	Institutions: Present	Institutions: Previous
G	minimum 3 years	78	F	1. Ukrainian 2. English	12 mons.	Seniors' Lodge (10 months, wandered)
H	2 years	77	F	1. English	3 months	None (wandered)
L	3-5 years	65	F	1. English	1 month	Seniors' Lodge (20 months, fears being lost)
M	6 years	76	F	1. English	26 months	None
I	minimum 3 years	83	F	1. Polish 2. English	12 months	Other N. Home (? months, wandered)
P	minimum 2 years	72	F	1. German 2. English	12 months	Seniors' Lodge (12 months, wandered)
E	minimum 4 years	85	F	1. English	27 months	Other N. Home (wandered)
N	3-8 years	74	F	1. English	3 months	None
S	5 years	79	M	1. English	26 months	None
T	6 years	69	F	1. English 2. French	14 months	None (wandered)

Mean age 75.8. Mean time in present facility 13.4 months, *SD* 9.94.

High-functioning Participants

Subj. Code	Wheel-chair	Age	Gender	First/Other Languages	Institutions: Present	Previous
An	-	84	F	1. English	9 months	Seniors' Lodge
Jt	Y	93	F	1. English	68 months	Rehab. Hospital
Wd	Y	85	F	1. English	53 months	Seniors' Lodge
My	-	89	F	1. English	55 months	None
Fn	Y	79	F	1. English	67 months	Other Nurs. Home
Ml	Y	83	F	1. English	66 months	Rehab. Hospital
Nl	-	79	F	1. English	2 months	None
Ry	Y	88	F	1. English	34 months	Active Hospital
Bn	-	87	M	1. Lithuanian 2. German 3. Russian 4. English	15 months	Seniors' Lodge

Mean age 85.2.

None of the high-functioning participants had prescriptions for anti-psychotics although 7 of the 9 received either or both anti-depressants and sedatives (see Appendix B). The drugs received by the SDAT participants were mentioned in Study 1 (see Appendix B). Both groups received laxatives and dietary supplements (not listed in Appendix B). The high-functioning had more prescriptions covering a wider variety of drugs for specific ailments than the SDAT participants.

Although medical records indicated all of the SDAT participants had very good understanding of English (Participant I was the only one who consistently spoke her first language), and they gave evidence of this, the SPMSQ was always presented in their first language (see Table 18). Therefore for three of the SDAT participants the test was conducted by an interpreter under the guidance of the researcher.

Facility. The floor plan of the nursing home is shaped like a cross. On the first and second floor four wings extending from a central nursing station. The main floor is devoted to offices, service areas (kitchen, two cafeterias, etc.) and recreation areas. There are several doors to the yard that are locked only at night. Of these doors only one opens to a landscaped area that is fenced. Lounge areas on the first floor open onto unfenced yard areas. On the second floor the Alzheimer residents were located on D-wing, designated as the Dementia wing in Figure 7, and the highest functioning female residents in the home were on A-wing, an area from which the Alzheimer residents were actively restricted. The latter wing is designated *High-functioning* on Figure 7. The single male high-functioning participant occupied the room on B-wing opposite the elevator.

Instruments

Coding. The data were collected using a coding scheme similar, but not identical, to that used in Study 1 (cf. Appendix C and Appendix I). The time constraints placed on the observer, who had only a few seconds in which to assess the context of the ongoing activity before recording the behaviour for a *point* in time, required that the coding scheme be limited to *state* behaviours that have measurable duration and not include momentary events (see Appendix J

Figure 7. Floorplan for the second floor of the nursing home.

Wandering Behaviours

Study 4 - Scans 142

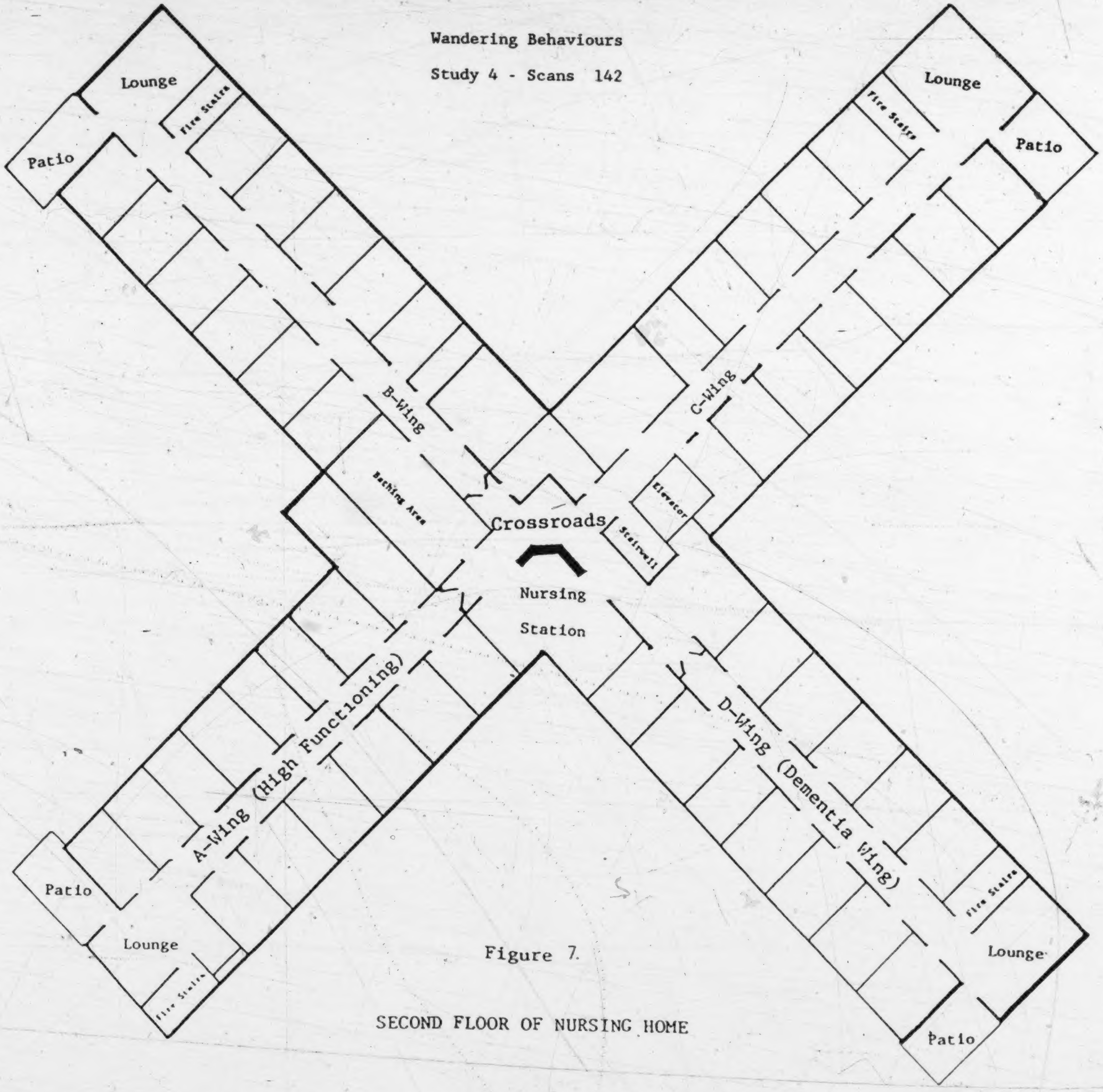

Lounge
Patio
Fire Stairs
Lounge
Fire Stairs
Patio
B-Wing
C-Wing
Bathing Area
Crossroads
Elevator
Stairwell
Nursing
Station
A-Wing (High Functioning)
D-Wing (Dementia Wing)
Patio
Lounge
Fire Stairs
Fire Stairs
Lounge
Patio

Figure 7.

SECOND FLOOR OF NURSING HOME

for observers' instructions). Observations were recorded using pencil and paper, that is, by entering data on standardized forms prepared for the study. Each form had a list of participants' codes, the participants' bedroom code, and spaces for behaviour and location codes. Comments about the setting events were added by the observers. With the exception of a few forms, an additional space was included beside each participants' code for recording whether or not the participant was restrained by some device. Coders worked in pairs twice a day to check interobserver reliability.

Recoding. The scan data were recoded in a similar manner to the recoding of the focal data in Study 1. Most of the wandering behaviours, however, were obtained through regrouping codes in the original coding scheme, but some recoding was done on the basis of comparisons of the location and activity of a participant who was away from her or his group, with the location and activities of other members of the group. Additionally, in a some instances recoding was based on comments written by the coders when the observations were made. This is explained further in Appendix K.

Definitions of the wandering behaviours used in recoding the scan data were based on the same ideas about wandering as the definitions used for the focal data, but basic differences in the two types of data required different recoding strategies and operational recoding definitions for some behaviours. These differences were important enough in the case of restless locomotion that the qualification *off-wing* was added to the term *restless locomotion*. This was done because restless locomotion in this study was defined to a large extent by the location in which it occurred (rather than the particular locations travelled during a walking bout, as it was defined for the focal data, cf. Appendix G).

Interobserver-reliabilities were high, averaging 1.00 for locations, .93 for behaviour, and 1.00 for restraint (kappa statistic, Cohen, 1960). The reliability statistic for *recoding* was 96%. The researcher used the observers' notes about the context in which activities were performed to assess the original codes in order to make two independent judgements, approximately one week apart, with respect to the changes that would be appropriate in light of the definitions of the wandering activities. Other recoding of the activity dimension utilized the SYSTAT statistical computer program (Wilkinson, 1987) and, therefore, intraobserver reliabilities were not done.

Procedures

The high-functioning participants and the SDAT participants were housed in different wings of the nursing home and the two groups kept different schedules for meals and activities. As a consequence, the scans of the two groups were functionally sequential, although in instantaneous scans one attempts to make observations of the participants as close to the same time as possible. Observers were allowed 10 minutes to locate and observe all participants of each group. The information for each participant was recorded when the observer initially encountered the individual.

Scans were repeated between 0800 and 2100 hours over a month long period during the time that focal observations were being made. Data were not collected later than 2100 because high-functioning residents requested that no observations be made after that hour because of their early bedtime. A total of eight scans per hour was included in the analysis, with the exception of the hour between 0800 and 0900, when the maximum scans available was less than eight. With 19 participants and each scan containing information for each participant there were 1,919 observations in total. One scan per hour per day was randomly selected for inclusion in the data, but not more, because of a possible lack of independence in scans made in the same hour of the same day. It was not possible to select two files per hour per day. With few exceptions the scans included in the analysis were those in which the two groups were scanned in the same hour of the same day.

Results

The unit of analysis was the behavioural event. Although usually an important function of scan sampling is the estimation of time budgets, the time measures in this study cannot be considered without the codicil that a hierarchical coding scheme was used. Hierarchical coding schemes differentially reduce the accuracy of behavioural frequency measures in a manner that is roughly an inverse of the behaviour's preeminence in the scheme. That is, the lower a behaviour was on the hierarchy, the less accurate the estimate for it may be (see Appendix G). Thus only the behaviours that have been prioritized can be considered *true* measures of total occurrence; they would be the same if they were coded separately (i.e., not as one of several other codes in the same observation system). In this study the hierarchical coding scheme prioritized the unusual as well as the social behaviours (see Appendix I), then the raw data were recoded to alter the hierarchy to prioritize behaviours related to locomotion (as much as possible, i.e., when the locomotion could be determined from location codes in conjunction with activity codes; see Appendices E and G). The difference between prioritized and nonprioritized behaviours is the prioritized ones were scored if they occurred, whereas the behaviours not prioritized were scored only if none of the prioritized behaviours occurred. Consequently only the prioritized behaviours are *true* measures (they will be identified in the discussion that follows on time budgets and other measures). However, acknowledging that the measures are biased by the hierarchical coding scheme that was used, an assumption is made that measures are comparable for the SDAT and the high-functioning participants because the information was collected in the same way for both groups.

Location. The percentage of total time spent at each location was calculated. Notice that the times spent at particular locations are not subject to any hierarchical influences because the location component of the coding scheme was not hierarchical. As illustrated in Figure 8, SDAT residents were in their own lounge area a majority of the time. They were on their own wing a total of 87% of the time and in their lounge 64% of the time. When they were off their wing they were usually in the crossroads (nursing station) area. They rarely went on other bedroom wings (2% on B- and C-wings and only 0.4% on A-wing). They were found in another person's private room without a reason, that is, trespassing, 0.2% of the time.

Figure 8. The relative proportion of time spent in various locations for cognitively high-functioning participants and SDAT participants based on instantaneous scan observations. The codes that are not self-explanatory are: *bedroom visits*, indicating that the participant was invited into the room; *private rooms*, indicating that the participant trespassed; *crossroads*, designating the central area where the hallways crossed and the nursing station area; and *off floor*, the code to denote that the participant had left the second floor (whatever the purpose).

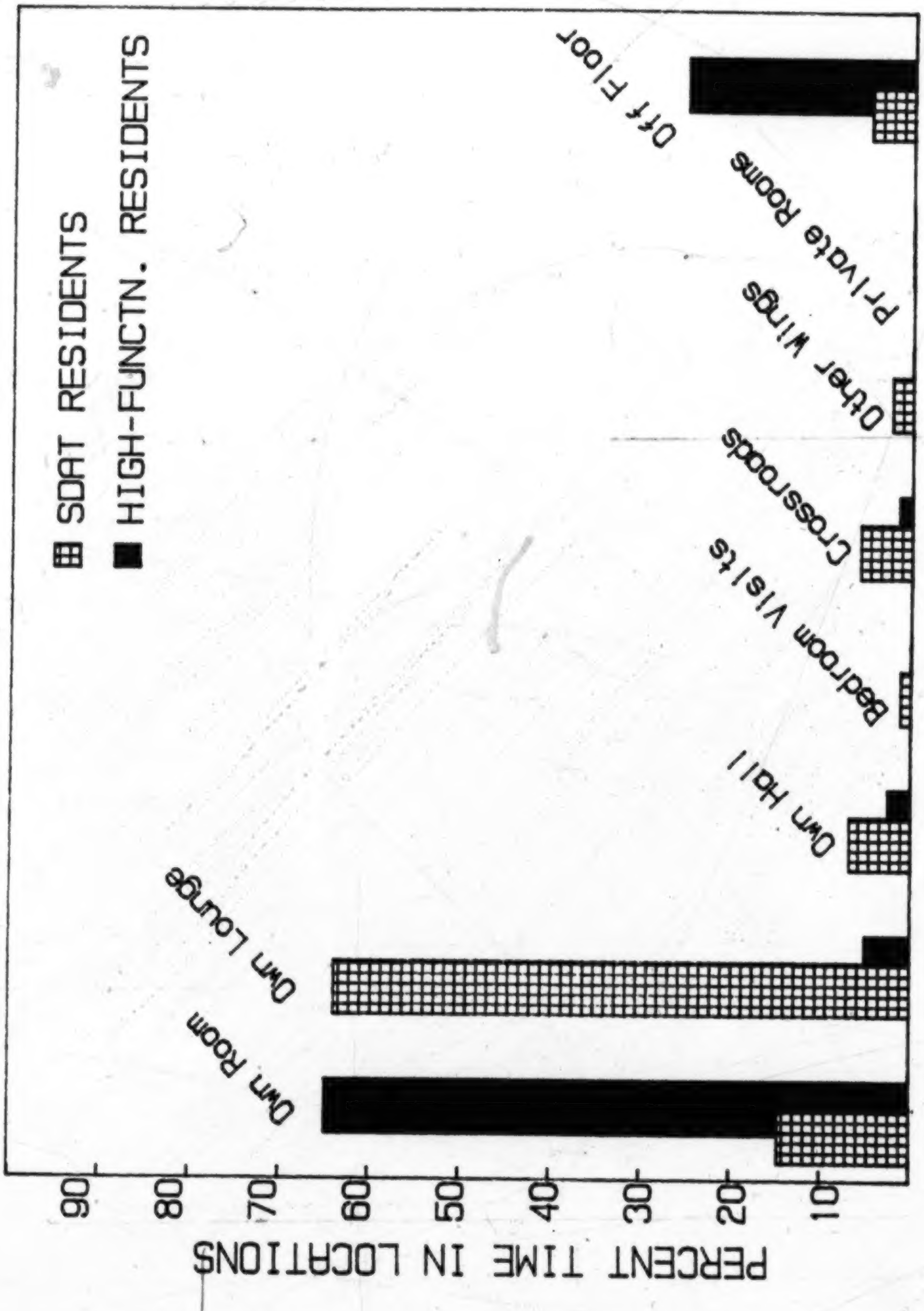

SDAT RESIDENTS
HIGH-FUNCTN. RESIDENTS
PERCENT TIME IN LOCATIONS
90
80
70
60
50
40
30
20
10
Own Room
Own Lounge
Own Hall
Bedroom Visits
Crossroads
Other Wings
Private Rooms
Off Floor

Figure 8.

In contrast, high-functioning residents spent as much time in their own rooms (65%) as SDAT participants spent in their lounge. The high-functioning residents spent only 5% of the time in their lounge although they were on their own wing a total of 73% of the time. When they were off their wing they were usually on the main floor, where their meals were served, or out of the home.

Activity. Figure 9 shows the relative time the groups spent in each type of behaviour. As explained at the beginning of the results section not all of the categories in Figure 9 represent *true* measures of time spent in the behaviours; only the behaviours that have been prioritized can be considered *true* measures of total occurrences. Absconding (all levels), trespassing, fiddling, searching, and unusual were all prioritized behaviours.

The wandering behaviours of absconding, trespassing, having navigational difficulty and off-wing restless locomotion did not occur in the high-functioning group, although searching and group walking occurred to a small extent. None of the stereotypic behaviours, such as repetitive picking and rubbing, was seen in high-functioning participants. In contrast, SDAT residents spent 1.7% of their time in the stereotypic-like fiddling activities. Surprisingly, social activities consumed approximately the same amount of time for both groups. Only 0.9% of the SDAT group's social activity was inappropriate. An example of inappropriate social activities would be unwarranted scolding of another person (appropriate and inappropriate social activities are combined in Figure 9). None of the high-functioning residents exhibited any inappropriate social behaviours during the scans. The majority of time, for both groups, was spent inactively lying or sitting but the high-functioning participants also spent a good proportion of their time in high focal activities such as hobbies, writing and reading. SDAT participants spent little time in high focal activities although they spent somewhat the same amount of time in low focal activities such as eating, grooming, and exercise groups.

The total time in locomotion was 15% for the SDAT participants, compared to approximately 2% for the high-functioning people. The 5 (56%) high-functioning participants who were in wheelchairs accounted for 60% of the locomotion in their group, thus they changed locations as much as those not in wheelchairs.

Approximately 13.2% of the SDAT resident's time was spent in wandering behaviours. Absconding from a room or activity accounted for 1.9% of the time with absconding from the floor and absconding from the nursing home accounting for only 0.1% each. Trespassing occurred 0.2% of the time. On occasions when the SDAT participants could not be found (0.9% of the time) the behaviour was counted as absconding from a room, because they were at minimum absconding from their wing and the group with which they were expected to remain. Trespassing may have occurred at these times, however, because observers did not search thoroughly in private rooms. They searched all public areas on the floor and looked in rooms with open doors. It was considered unlikely that the SDAT participant had absconded from the floor when she or he could not be found because enough notice was taken of such events that the observer would have become aware of them when the participant was later found.

Figure 9. Relative percentages of time spent in the seven types of wandering behaviours (absconding, restless-locomotion-off-the-wing, navigational difficulty, trespassing, fiddling/stereotypies, searching, and group walking), as well as, unusual activities, care given (being given nursing care), inactivity, purposive walking, general movement, low focal activities (e.g., eating) and high focal activities (e.g., reading), left home (leaving the nursing home on an approved social outing), and social activities, for cognitively high-functioning participants and SDAT participants. These percentages are based on instantaneous scan observations.

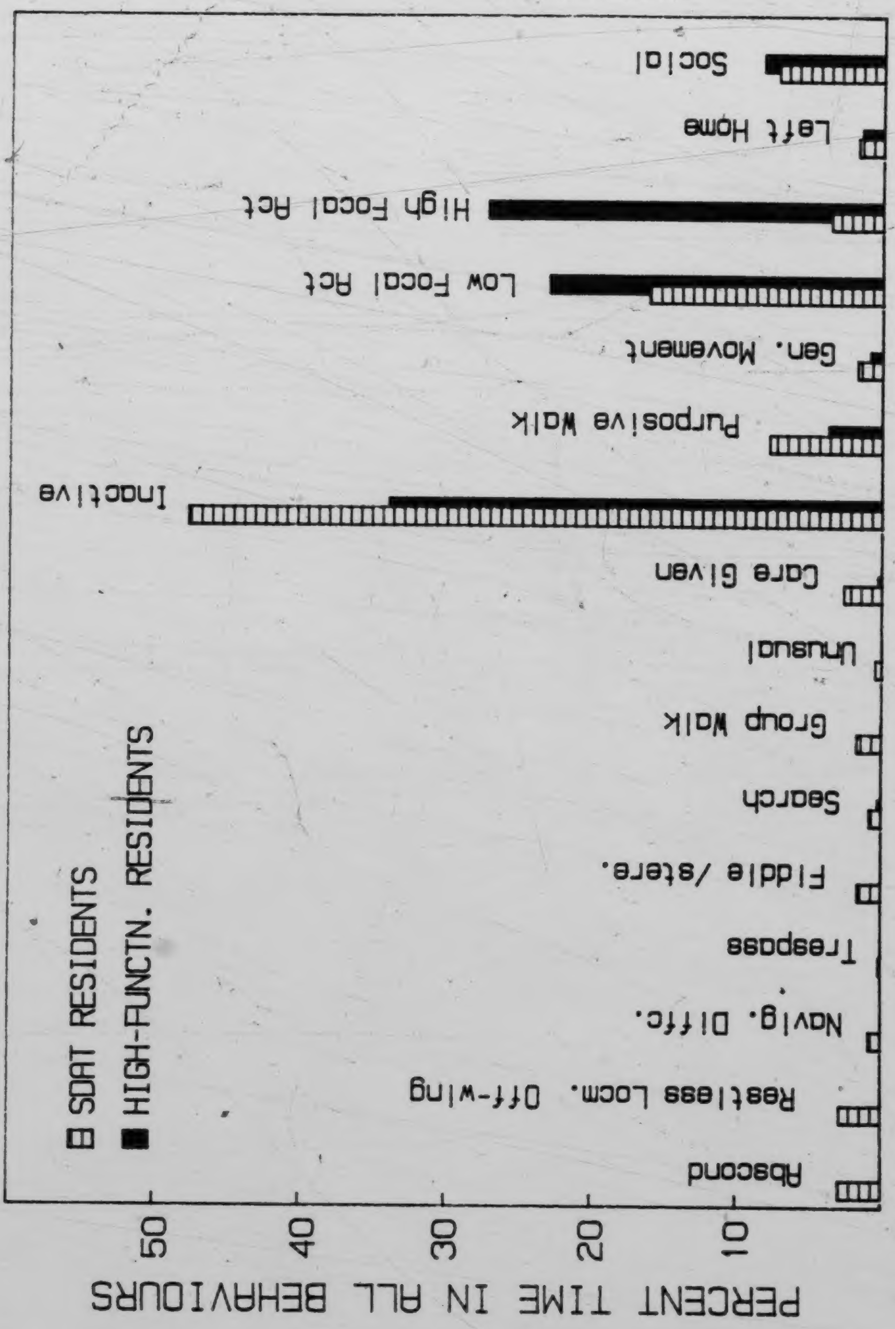

PERCENT TIME IN ALL BEHAVIOURS
10
20
30
40
50
▤ SDAT RESIDENTS
■ HIGH-FUNCTN. RESIDENTS
Abscond
Restless Locm. Off-wing
Navig. Diffc.
Trespass
Fiddle /stere.
Search
Group Walk
Unusual
Care Given
Inactive
Purposive Walk
Gen. Movement
Low Focal Act
High Focal Act
Left Home
Social

Figure 9.

Restraint. High-functioning participants were never restrained. In contrast, Table 19 shows that only one of the SDAT participants was never restrained, but the charge nurse had made it a matter of record that she was not to be restrained. Other individuals in the SDAT group were restrained from 2% to 47% of the time, with the mean being 26% of the time. The percent of observations during which individuals were restrained did not vary with the extent of their wandering behaviours. Thus the percentages for the two participants designated excessive wanderers in Study 1 were 13% and 17%, whereas the percentages for the two nonwanderers were 0% and 47%, and the moderate wanderers percentages were 2%, 14%, 22%, 27%, 28%, and 33%.

Table 19

PERCENTAGE OF TIME SDAT RESIDENTS SPENT IN ACTIVITIES WHEN RESTRAINED AND NOT RESTRAINED

(Estimates are based on frequencies collected with a hierarchical coding scheme, cf. Appendix G)

	Restrained	Not Restrained
Absconding from room^{P}	0.5*	2.7
Absconding floor^{P}	0.0	0.1
Absconding home^{P}	0.0	0.1
Navigational diffct.	0.0	1.1
Off-wing Restless locomotion	0.0	3.8
Fiddling^{P}	3.8	1.5
Searching^{P}	0.0	1.2
Trespassing^{P}	0.0	0.0

Group walking	0.0	2.3
Purposive walking	0.0	6.7
General movement	0.5	1.9
Inactive	48.1	48.8
Appropriate Social	8.0	6.2
Inappropriate Social	0.5	1.0
Low focal (e.g. eats)	35.3	10.9
High focal (e.g. reads)	0.0	4.2
Care Given	2.7	2.1
Unusual (e.g. delusional)^P	0.5	0.5
Unobservable^P	0.0	3.6
Not found^P	0.0	1.1

Notes: ^{P}The superscript denotes the behaviour was prioritized and therefore percentages are equivalent to those that would be recorded if observations were done independently of the coding system.

*Restraint was being applied after an absconding incident.

Missing data, resulting from restraint not being measured on 10 scans, was not considered in calculating percentages, therefore, percentages for particular behaviours in the second column will not be equivalent to the percentages in Figure 9.

The only form of restraint used for SDAT participants was that provided by the confining trays of geriatric lounge chairs or geriatric wheelchairs. The numbers in Table 19 represent the percentage of observations for which the trays of these chairs were observed to be in place.

SDAT individuals were rarely restrained anywhere else except their lounge. Fully 98% of the occasions on which they were restrained occurred there. Because meals were customarily served to SDAT residents while they were confined by the tray of a geriatric lounge chair, it was not surprising that participants were involved in low focal activity, such as eating, for 35% of the time they were restrained. The increased number of people in the lounge during mealtimes may have accounted for the slight increase in social activity. For nearly half of the time that participants were restrained, however, they were inactively sitting.

Restraint, of course, prevented locomotion, therefore, it inhibited all wandering behaviours except fiddling or stereotypic movements. These movements more than doubled by increasing from 1.5% to 3.8% when participants were restrained. An examination (in Figure 10) of the restraint by hour of the day reveals that the confinement period greatly exceeded the half-hour mealtime. Figure 10 illustrates the effect of restraint on all the wandering behaviours that involve locomotion. Fiddling (or stereotypic movement) was the only wandering behaviour not included in the graph. Table 19 indicated that it more than doubled during a period of restraint.

Analyses. The likelihood ratio chi-square (G^2) was partitioned to determine the statistical association of classes of behaviours with the participant groups (Bishop et al., 1975; Wilkinson, 1987). Six classes of behaviour were used: (1) the wandering behaviours of (off-wing) restless locomotion, fiddling (or stereotypic movement), searching, trespassing, group walking, and absconding (from the room, floor, and facility, including occasions when the participant could

Figure 10. Frequency of SDAT participants' restraint graphed by hour of the day. Although the only form of restraint used for SDAT participants was the trays of geriatric lounge chairs or geriatric wheelchairs, their confinment in these chairs extended beyond the actual meal periods which seldom occupied more than a half-hour period (at 0900, 1230, and 1730 hours). High-functioning participants were never restrained.

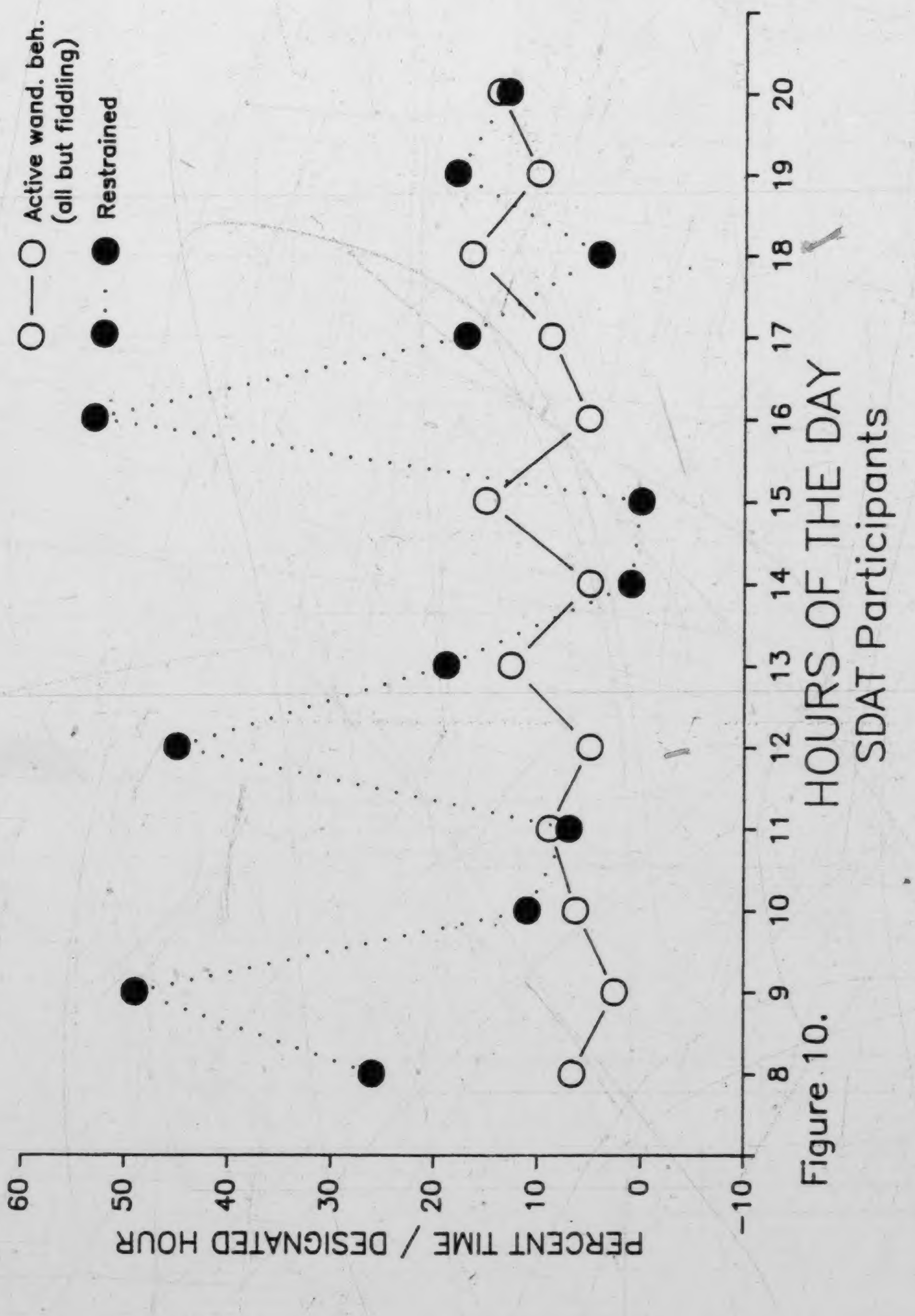

PERCENT TIME / DESIGNATED HOUR
60
50
40
30
20
10
0
−10
8
9
10
11
12
13
14
15
16
17
18
19
20
HOURS OF THE DAY
SDAT Participants
○—○ Active wand. beh. (all but fiddling)
●··● Restrained

Figure 10.

not be found); (2) other locomotion, primarily purposive walking or wheelchair movement but also general movement (transitions or starting to move); (3) functional behaviours, including appropriate social behaviours, high focal activities (e.g., reading) and recreational trips (out of the nursing home); (4) nonfunctional behaviours that had negative connotations for competence such as delusions, inappropriate social behaviours and receiving total care such as being bathed or fed; (5) neutral behaviours such as low focal activities (eating, grooming, etc.) and inactivity; and (6) nil behaviour or instances when participants could not be observed and missing data. The frequencies of the six behavioural classes are presented in Table 20.

Table 20

BEHAVIOUR FREQUENCIES CLASSIFIED BY TYPE

(Frequencies were collected with a hierarchical coding scheme, cf. Appendix G)

Behaviour	High Functioning	SDAT Participants	Total
Wandering	113	4	117
Locomotion	43	82	125
Functional	337	119	456
Nonfunctional	3	42	45
Neutral	519	653	1172
Nil	3	11	14
Total	1018	911	1929

The overall chi-square for the groups, using these six classes of behaviour, was significant (G^2 302.47, *df* 5, $p<.001$, cf. Table 21). Most of the difference between groups is accounted for by high-functioning participants exhibiting significantly more functional behaviours and significantly less nonfunctional and wandering behaviours than the SDAT participants (G^2 267.56, *df* 1, $p<.001$).

Table 21

LIKELIHOOD RATIO CHI SQUARE PARTITIONING OF ACTIVITIES

Contrast	LR-Chi Square	*df*	Signif.
Functional + Nonfunctional + Wandering Behaviours vs. Neutral + Nil Behaviours + Other Locomotion	26.62	1	<.001
Functional Behaviours vs. Nonfunctional + Wandering Behaviours	267.56	1	<.001
Nonfunctional vs. Wandering Behaviours	0.76	1	.382
Neutral vs. Nil vs. Other Locomotion	7.52	2	.023
Total LR - Chi Square	302.47	5	<.001

The small chi-square for the comparison between other locomotion, neutral and nil behaviours is probably due to the SDAT participants greater amount of general locomotion. The SDAT participants' locomotion *on their own wing* was not labelled restless locomotion in this study because of lack of sufficient evidence that it was without purpose (cf. Appendix K).

It should be noted that, if the estimate of time spent in restless locomotion according to Study 1 (focal data) is accurate, (see Appendix G), then the estimate according to the scan data does not represent the true extent of this behaviour. However, the off-wing restless locomotion (2.8%) in the present study can be considered the amount of restless locomotion, engaged in by SDAT participants, that would be troublesome to residents on other wards.

Discussion

This study compared the behaviours of demented participants with those of high-functioning residents in the nursing home. The comparison was undertaken to demonstrate that cognitively alert residents of a nursing home are generally not found restlessly walking the halls as though some sense of confinement were motivating the movement and, therefore, the wandering behaviours are probably unrelated to the institutional setting. High-functioning participants did not engage in restless locomotion or stereotypic behaviours and they did not trespass or abscond. Two high-functioning residents were found walking arm-in-arm once but that was the extent of their group walking. Another time a pair was found searching for something in the lounge of another wing. Yet another time one was involved in a search for someone in the crossroads area, but these two events accounted for all of the searching. As expected, the wandering behaviours were significantly associated with the SDAT participants when contrasted to high-functioning participants.

The high-functioning participants were found to do relatively little walking compared to SDAT participants. Observers comments suggested high-functioning residents crossed the halls primarily for three types of things, to go to their lounge for evening coffee, to go to the central area when some particular service was sought, and to travel the route to the elevator when on their way to a planned function or their meals.

Stilwell (1988) has said it is not unusual to see patients with "restraints on all four limbs plus a jacket or body belt restraint". The form of restraint measured in this study was very subtle in comparison. Nevertheless, it meets her definition of restraint, that is, a device or material that, when attached to or adjacent to the person's body, "prevents free bodily movement to a position of choice (standing, walking, lying, turning, sitting)...and cannot be controlled or easily removed by the person".

In the present study the chair trays appeared to have been used to confine SDAT residents beyond their normal meal times. Unfortunately, the two types of chairs, the geriatric wheelchair and the geriatric lounge chair were not differentiated by observers in the present study. The importance of the distinction was not realized until, part way through Study 1 of the dissertation, the researcher discovered through *ad libitum* observations that only the trays of geriatric wheelchairs unequivocally restrained the occupants of the chairs. It was noticed in *ad libitum* observations that the heavy and awkward to remove trays that confined most persons in the geriatric lounge chairs were removed, or could be removed, *some* of the time by *some* of the SDAT individuals (the description of trays is based upon the researcher's attempts to remove them). The participants who were able to remove trays may have tolerated their presence when the trays were left in place or the participants may not have been cognitively competent to remove them at all times.

There was not enough information provided in scans to determine why any particular participant removed the tray on some occasions and left it on others. It is possible that the percentage of observations for which particular individuals were noted to be restrained roughly matched their tolerance of the restraining trays.

The focal observations in Study 1 of the dissertation did not measure restraint as an independent dimension, which would have permitted a better analysis of the behaviours associated with restraint. During the focal observations coders began to suspect that the trays were functioning as restraints because they were often put in place long before meals and they were not removed until long after meals ended. These *ad libitum* observations suggested that restraint be measured in the scans, but the *ad libitum* observations were not detailed enough to indicate that it was necessary to distinguish between the two types of chairs. Further research is necessary to differentiate the conditions under which some persons with SDAT are able to remove the trays from geriatric lounge chairs.

General Discussion and Conclusions

The four studies in the present research are summarized here, followed by a discussion of the particular wandering behaviours chosen for inclusion in the current research and then the implications the results have for future research and management strategies. The four studies were generated by a perceived need for direct measurement of wandering behaviour. The literature on this major clinical problem has relied heavily on retrospective studies and still lacks empirical data on some fundamental issues. Studies employing direct observation can balance retrospective studies by presenting an authentic picture of the patterns, frequency, and extent of the wandering behaviours, and by accurately recording the situations in which demented residents engage in the behaviours.

The methods used in the present studies have a number of limitations, however. Although Studies 1 and 2 employed direct observation it was necessary to recode the data in order to distinguish some of the wandering behaviours, such as restless locomotion; the need for better definitions of wandering behaviours is discussed in more detail below under future research. Another limitation is the fact that the recoding was done by a single researcher. Although *intra*observer reliability was determined for the recoding process, it would have been better to have two recoders and *inter*observer reliability statistics.

A more serious limitation is the fact that the results cannot be generalized to other nursing home populations because the SDAT participants were not randomly selected. They were selected because they all received their diagnosis from the same medical team and lived in one special dementia unit, but they may differ in some important ways from SDAT populations in other nursing homes. For example, the SDAT participants had a very high number of wanderers and this may be a result of the special unit being on the third storey (i.e., the *second* floor). Some wanderers were transferred to the unit in hopes of controlling their absconding (see Table 18). Additionally, the nursing home was not apt to have demented persons with behaviours that other residents found particularly distressing. One such resident was transferred to a mental hospital during the study, after considerable lobbying by the charge nurse and 3 months of documentation by the caregivers associated with the special unit.

Moreover, in respects other than their diagnosis, which does not ensure they were a homogeneous group (according to most theories of Alzheimer's disease), the SDAT participants from the special unit were dissimilar in many ways (see Table 18, Appendix B). However, homogeneity of their behaviour patterns was assumed across participants determined to be similar in the chi-square partitioning of their data. Within the groups of nonwanderers, excessive and moderate wanderers the data were pooled across hours and days (see Machlis, Dodd, & Fentress, 1985 for an argument against pooling observations). To the extent that individuals (and perhaps different hours and different days) contribute different probability structures to the group data, the assumptions of homogeneity may be called into question. This may be a problem for the sequential analysis of data. Certainly the findings are not appropriate for generalization to a population at this point. In order to do this, it would be desirable to have more closely matched subjects, preferably from a large number of different nursing homes, and a more complete description of the population to which the results are being generalized. It would also be useful to have multiple measures over time on the subjects in order to give some index of the stability of the measures and their relationship to the dementia diagnosis.

The inadequate measure of restraint in Study 1 has to be considered another limitation. The measurement of restraint in Study 4, and its effect on the wandering behaviours (all but fiddling were reduced to negligible amounts) pointed out the need to measure this variable as an independent dimension whenever the focus is on wandering behaviours. This probably holds true for any behavioural studies conducted in situations where residents are likely to be restrained. Although it was evident in Study 4 that restraint played an important role in the extent to which participants could engaged in wandering behaviours, restraint was only measured in Study 1 by having observers comment on whether restraints were part of the setting events (see Appendix D). Observations of restraint in Study 1, therefore, were not detailed enough, in comparison to the second-by-second recording of other behaviours, for rigorous analysis.

Comparisons with Other Behavioural Studies

In Study 1, using focal observations of SDAT participants, it was shown that various participants engaged in significantly different amounts of the wandering behaviours (i.e., restless locomotion, absconding, trespassing, fiddling, navigational difficulties, searching, and group walking). Restless locomotion, the only wandering behaviour that has received even a modicum of research attention, comprised a sizable proportion of most SDAT participants' time. Two participants, considered *excessive* *wanderers*, spent 41% of their time in wandering behaviours, with restless locomotion, the major activity, consuming 23% of total time. Two, others engaged in wandering behaviours for only 8% of the time and were considered *nonwanderers*. They spent 2% of their time in restless locomotion with fiddling being their major wandering activity and taking 3% of total time. The other six participants spent 27% of their time in wandering behaviours and thus were termed *moderate wanderers*. Restless locomotion occupied 14% of their total time. The results are comparable with those of Meacher (1972) and Snyder et al. (1978)

Only two major behavioural differences, other than the extent of their wandering behaviours, distinguished the three groups of SDAT participants in the Study 1. One was their involvement in social activities. The more a group was involved in wandering behaviours, the fewer social events occurred. However, because wandering behaviours were prioritized and social activities were lower in rank, this was expected. As well, as one would expect, the more incidents of wandering activities there were, the fewer the episodes of inactive sitting. Snyder et al. (1978), similarly, found that wanderers were less social and more active than nonwanderers. Surprisingly, in view of the lore that persons with SDAT have very disturbing behaviours, the unusual activities such as talking to oneself and evidencing hallucinations or delusions consumed less than 0.5% of the participants' time. Unusual behaviours had high priority so all that occurred would have been recorded. Although Snyder et al. (1978) found that wanderers engaged in more disturbing behaviours such as screaming and calling out, the association found in Study 1 between the amount of wandering behaviours engaged in and the amount of unusual activities went in the opposite direction. This was likely due to the proclivity of one nonwanderer for talking to herself.

Meacher's (1972) study suggested that wandering behaviours are part of the behavioural repertoire of persons with dementia and are not precipitated in any direct way by the institutional setting. This was confirmed by comparisons in the present research between the SDAT participants and a group of high-functioning participants who lived in an adjacent wing of the nursing home and who had access to the same public areas on the second floor of the home. Four incidents accounted for all of the wandering behaviours exhibited by the high-functioning participants: one instance of group walking and three of searching. These involved a total of five high-functioning individuals (a time budget for high-functioning participants derived from the data in Study 4 would not be directly comparable with other research because of the bias introduced by the hierarchical coding scheme, see Appendix G).

Observation of the high-functioning participants underscored the fact that SDAT participants engaged in a variety of repetitive movements, often combined with their handling of objects, that were not evident in high-functioning participants. High-functioning participants rearranged things and handled objects but there were qualitative differences between their movements and those of SDAT participants. The motions of the SDAT participants reminded one of hand-sanding, wood-planing, cloth-picking and cigar- or hem-rolling and appeared to be stereotypic in nature. Hussian has suggested these stereotypic movements, which are analogous to the fiddling behaviours in the present research, can be used as a reliable diagnostic tool to distinguish cortical atrophy (Hussian, 1981). This report supports his hypothesis, although it was not intended to provide a critical test of it. It should be noted, however, that the results of Study 1 indicated that nonwanderers engaged in nearly the same amount of fiddling as the wanderers, suggesting that more careful analysis of these movements and the conditions under which they appear is required.

How Dangerous Are The Dangerous Wandering Behaviours?

Although the various wandering behaviours accounted for 41% of the time measured for excessive wanderers and 27% of the time measured for moderate wanderers, not all of the wandering behaviours are equally problematic. Restless locomotion, group walking, fiddling with objects, having navigational difficulties and searching for things seem innocuous, in themselves, and these accounted for almost all of the time spend in wandering behaviours.

Absconding and trespassing, the wandering behaviours most apt to result in exposing a resident to danger, were seldom seen in Study 1 whether one evaluates relative frequencies or time budgets. A major finding of Study 1 was the revelation that the two dangerous behaviours combined had such a small time-based probability. It was only .01 for all SDAT participants. By groups the aggregate probability varied from .02 for excessive wanderers to .001 for nonwanderers with moderate wanderers having a probability of .01 for trespassing and absconding (from a room/activity or from the floor to another location in the nursing home). Study 4, with its larger number of observations of individuals, found higher rates of absconding. The time-based probability for all SDAT participants of absconding from a room or activity was .019, and for absconding from the floor and absconding from the nursing home the probability was .001.

Because absconding from the building did not occur during the periods when participants were under observation in Study 1, but nevertheless was known to happen, Study 3 was devised. In Study 3 a count was made of the number of incidents of absconding, of the different levels, from the special dementia wing that occurred during a three month period. The number of incidents was used to evaluate whether residents who were judged to be wanderers absconded more than those judged to be nonwanderers. Surprisingly, there was no significant difference between the number of nonwanderers and the number of wanderers who left either the wing or the facility. This is another major discovery and the implications will be discussed below under the heading *implications for management strategies*.

In light of the results of Study 3, the focal observation methodology used in Study 1 appeared to be ill-suited for detecting these rare behaviours. Study 3 showed that the number of absconders among the population of the special unit (i.e. those who absconding to another floor and from the facility) over a three month period were approximately double that found in Hiatt's (1985) survey of 170 nursing homes. Hiatt's survey reported that the nursing homes averaging 2.4 absconders per facility during a three month period. However, the special unit in the present study had seven instances of absconding, involving total of five residents. That is, three wanderers and two nonwanderers absconded from the floor but one of the wanderers absconded twice and another absconded four times. The number of absconding events for the nursing home was not known.

Sequential Analyses of Wandering

The data collected in the focal observations permitted a sequential analysis of wandering behaviours, the first to appear in the literature. The detailed analyses for each of the wandering behaviours presented in Study 1 can be distilled to three main findings. The first is the strong evidence that a repetitive three-component sequence of behaviours was characteristic of both groups of wanderers. The sequence consisted of restless locomotion, navigational difficulty, and group walking. That is, the restless locomotion in which these participants engaged was interspersed with hesitations and visual scanning of the environment (i.e., navigational difficulty). And as a component of this pattern of solo locomotion there were intervals of group walking, as wanderers briefly joined hands or linked arms, although group walking occurred far less often than solo locomotion.

Although the evidence is less compelling, because of the rarity of some of the behaviours, the lag sequential analyses also indicated significant links between trespassing, absconding from the room, absconding from the floor, and fiddling. This was evident in both groups of wanderers. The implications are discussed below under the heading *implications for management strategies*. As mentioned above when dangerous behaviours were discussed, however, there were few incidents of trespassing and absconding from the floor, and more research on this pattern is necessary.

Surprisingly, the relationship that has been assumed to exist between absconding and restless locomotion was not well supported. For example, no strong evidence was found for the assumption that restless locomotion has a high probability of evolving into an absconding incident. Although restless locomotion occurred during some absconding incidents of some wanderers, it was not associated with every incident, thus there was no consistent pattern linking the two behaviours. Furthermore, it appeared that the amount of restless locomotion did not play a critical role in absconding because one of the participants who exhibited the most restless locomotion did not abscond from the floor, although some who exhibited far less restless locomotion did abscond. This finding, coupled with the evidence that nonwanderers and wanderers are equally at risk of absconding (mentioned in the discussion of the dangerous behaviours), has implications for management of persons with SDAT and will be discussed further under that heading.

The Choice of Wandering Behaviours

Before evaluating the choice of the particular wandering behaviours studied in the present research, the utility of conceptualizing wandering as a number of behaviours deserves comment. Hiatt (1988) has recently espoused this notion of assessing "wandering phenomena" individually, after protesting that they "are treated as though all motion, judgement and environments posed the same risks" (p. 637). Comparisons between studies would be facilitated if researchers clearly stated the particular behaviours in which they were interested and provided definitions of each of them, rather than using broad all-encompassing definitions of wandering. Unfortunately, much of the research has not defined wandering at all.

The present research is the first to this investigator's knowledge that has conceptualized wandering as a number of behaviours. The method has been useful for investigating the relationships between some behaviours that are functionally different but morphologically similar. For example, the primary difference between either trespassing or absconding and restless locomotion is the location where the behaviour occurs. Viewing these as three behaviours, rather than one, has permitted exploration of the transitions between the behaviours. The same can be said of distinguishing restless locomotion in a group from that done alone. In this case a brief touching of hands or arms was the chief distinction, not the place of locomotion.

The present research investigated fiddling, navigational difficulties, and searching, as well as absconding, trespassing, restless locomotion, and group walking. The choice of wandering behaviours was largely determined by the meanings conferred upon the term *wandering* by clinicians and researchers. This constellation of behaviours was not intended to serve as more than an operational definition of wandering, but the question arises as to whether these are an appropriate group of behaviours to classify as wandering. Because complex and interesting relationships among these behaviours have been empirically demonstrated I believe that all of these are appropriate behaviours to *measure* when one is concerned with wandering, but whether all should remain *classified* as wandering behaviours is another question. Most of the relationships between the behaviours are not as simple and straightforward as the one found between restless locomotion, navigational difficulty and group walking. One cannot say, for instance, that participants who exhibited one of the wandering behaviours exhibited most of the others, or that the more a participant was engaged in one wandering behaviour the more one could expect they would be engaged in the others (cf. Appendix F). The participant who exhibited the highest level of restless locomotion and group walking never trespassed and never absconded from the floor although she frequently absconded from a meal to continue walking.

Some evidence in the present research suggests that fiddling should not be classified as a wandering behaviour, although research by Hussian and his colleagues suggested fiddling might characterize a particular kind of wandering locomotion. The results of Study 4 in the present research, indicated fiddling is associated with dementia, as Hussian has suggested. However, in Study 1 where fiddling was found to pervade the SDAT participants' activities, *nonwanderers were found to engage in nearly equal amounts of fiddling as moderate wanderers and excessive wanderers*. This was true whether measures were frequency or time based. Another reason why it seems inappropriate to classify fiddling as wandering is that all of the other wandering behaviours have locomotion as their major component. Thus, fiddling is not a wandering behaviour in the same sense that the others are. The removal of fiddling from the constellation of wandering behaviours has minor effects. The overall conclusions remain the same, but some totals need adjustment. For example, the aggregate event based probability for the remaining wandering behaviours becomes .03 for the nonwanderers, .16 for the moderate wanderers and .38 for the excessive wanderers (when fiddling was included the wandering behaviours had a aggregate event based probability of .10 for nonwanderers, .28 for moderate wanderers and .50 for excessive wanderers). Thus the removal of fiddling does not require any adjustment to the group labels.

Searching raises some similar questions. Although it seems appropriate to include active searching that has a locomotive component (i.e., mobile searching) among wandering behaviours, it seems inappropriate to include a stationary activity, such as rummaging through a handbag. This was not a problem in the present research because the behaviour was seldom seen. However, given the possibility that a decrease in searching activities may mark the progression of dementia, it may be advisable to distinguish between mobile and stationary searching. The inference that searching may be inversely related to dementia comes from Meacher's (1972) finding that searching behaviours were inversely related to the subjects' amount of locomotion and dementia; that is, the severely confused spent none of their time looking for things, whereas the moderately confused spent 7.7%, in contrast to the rationale residents who spent 2.7% of their time looking for things. Study 1 offered some support for the notion of an inverse relationship because searching occurred in the nonwandering group but not in the excessive or moderate wanderers and it was negatively correlated with all the other wandering behaviours, moreover, on an individual basis the participants who engaged in the most searching engaged in the least of the other wandering behaviours (cf. Appendix F).

The other behaviours of trespassing, restless locomotion, group walking, navigational difficulties, and the three levels of absconding do not present such problems and the classification of all of them as wandering behaviours seems appropriate. Mobile searching can be included as well, but there may be other behaviours that would be appropriate in some facilities, such as attempts to open doors in locked wards. The initial suggestion was that *wandering* be treated as a comprehensive term for these behaviours. There is no good evidence that these behaviours have some drive such as anxiety underlying them or that *wandering* should be considered a psychological construct. Correlations between the behaviours were too low to entertain such notions.

Future Research: What and Why

A program for wandering research. The most important task for the observational researcher interested in wandering behaviours is the development of definitions that allow the coder to recognize the component behaviours as they occur (i.e., the different levels of absconding, navigational difficulty, restless locomotion, searching, trespassing and group walking, but not fiddling). The definitions used in the present research are a step in that direction but before adequate definitions will emerge, there are some prerequisites: 1) further observation with narrative description, 2) then redefinition, and 3) pilot observations with the new definitions.

An attempt should be made to develop a definition for the *directed wandering locomotion* that has been observed by Meacher (1972), Snyder et al. (1978), and Rader, Doan, and Schwab (1985). Although it was not possible to identify this form of locomotion during the recoding of the focal data, it may be possible to differentiate a directed form of *restless locomotion* from locomotion that appears to have no purpose by concurrently gathering information on environmental factors, such as a social groups, that may attract wanderers at particular times. Because some researchers have used both pacing and wandering as terms to describe dementia behaviours (e.g., Lawson, Rodenburg, & Dykes, 1977), it is also possible that a directed form of *restless locomotion* may be expressed by the rate of locomotion. That is, individual subjects may exhibit a slow meandering style of travel as well as quicker, more directed style, and the two speeds might distinguish undirected and directed locomotion.

The new definitions should be part of a new coding scheme that does not have the same hierarchical properties as the one used in the present research so that more accurate estimates of frequencies and durations can be obtained without the necessity of recoding (of course, Study 4 results delineated the necessity of including restraint as a separate dimension in any new scheme). Als, Tronick, and Brazelton (1979) describe a combined microbehavioural and macrobehavioural scoring system that would be a good model for the levels of information that are suspected to be necessary for distinguishing *directed wandering locomotion* from other forms of *restless locomotion*. A coding scheme based on their model would also allow information to be coded at the level necessary to pick up the components of the characteristic gait noticed in some individuals with SDAT (see Appendix D, code 29) as well as some of the microbehaviours purported to be associated with akathisia. More observational research is needed on both these topics. Koller, Glatt and Fox (1985) have suggested that the senile gait is a distinct neurologic entity yet gait differences have generated little research. Van Putten and Marder (1987) report that akathisia currently is difficult to diagnose without the patient's subjective report of a compulsion to keep in motion. However, they suggest that there are "telltale foot movements: rocking from foot to foot while standing or walking on the spot" (p. 13). Considering the fact that Hussian and his colleagues suggest akathisia is implicated in wandering in some cases, as well as, the fact that individuals with SDAT are not apt to report any compulsions to move, this is an important topic for a research program to address along with senile gait.

The most important question arising out of the present research is whether the behavioural patterns uncovered by the lag sequential analysis will generalize to other individuals with SDAT in other institutional environments. With this central issue, as well as the enduring objective to describe wandering behaviours and determine their precipitants and new definitions embedded in a new coding scheme, the research program can then assess wandering behaviours in some widely varying institutional environments. There are hints in the literature that floor plans may exert strong influences on wandering behaviours. For example, Williams and Wilson (1974) reported that elderly confused persons who had been difficult to manage because of restlessness and a tendency to wander, ceased this behaviour when they were transferred to an facility with an open plan and a minimum number of corridors. "It seems that it is a natural response to explore corridors and corners, and this results in aimless wandering" they said (p. 61). Lawton[1] has indicated that the special unit at the Philadelphia Geriatric Center has less than the average percentage of wanderers although "they love it". The low percentage may result from the facility having no halls and the wanderers being presented with a vista that encompasses all of the public areas available to them. The crossed hallways of the facility in the present research, as well as the lounges at the end of each hall may have elicited restless locomotion in participants who would have only evidenced a *tendency* to wander in other locations. Because the results of research on wandering in institutions of different designs could have wide implications for future designs and renovations, further investigation is imperative.

Not only does the physical context affect social interaction, the social context may affect it too. The possibility should be entertained that the social context of special dementia units, such as the one in this study may precipitate *more* disturbing behaviours than integrated nursing home environments. Hussian and Davis' research in a locked ward suggests some wanderers may walk because they are modelling the behaviour of others. If the restless locomotion of some persons affects others under some environmental conditions, then many behaviours may have this effect. Lamb (1979) reminds researchers that context-free observation is an unattainable goal. If those being observed are part of a larger group, then each of the individuals in the group may affect the behaviour of the others. Although most researchers would like to believe that the interactions they observe are reliable and representative, is it increasingly apparent, Lamb says, that "the patterns of interaction are heavily influenced by the context in which they are observed" Lamb (1979, p. 10).

A number of important questions have not been addressed by the present research. These include questions about demented persons evidencing different patterns of behaviour through the day (Evans, 1987) and variations from day to day in persons suffering from SDAT (an assumption often made but supported only by anecdotal examples). Additionally, because restraint is widely used to control the behaviour of demented persons (Evans & Strumpf, 1989), there is need for observational research on the behavioural and emotional effects of restraints.

Methodological issues. There were methodological issues raised in the present research of concern to other behavioural researchers. Study 2 addressed two related issues. The first was the validity of research that has used one or two caregiver's ratings to distinguish wanderers from nonwanderers and the second concerned the validity of retrospective assessments of wandering behaviours based on caregivers' ratings. Both issues were tangentially related to the perceived need for behavioural research in contrast to retrospective studies.

The issue of the validity of retrospective assessments of wandering behaviours arises because retrospective studies have come to dominate the small literature on the topic. Even the Snyder et al. (1978) behavioural study began by asking staff members to classify wanderers and nonwanderers. Of more concern is the recent report of Cohen-Mansfield and her associates reporting *frequencies* of a wide range of behaviours, when the *frequencies* were based only on a questionnaire, or, more explicitly, on the Likert-scaled ratings of nursing home residents provided by charge nurses (Cohen-Mansfield et al., in press). Also of concern is the fact that neurological research on wanderers (de Leon et al., 1984) may be unsound because it is prefaced on caregiver-selected subjects. Although the literature indicates that researchers routinely depend on caregivers' judgements in selecting subjects for investigations of wandering, there were no previous studies comparing objective reports and subjective reports of the topic.

Study 2 found that when caregivers' ratings of the SDAT participants were measured against the behavioural data (i.e., the systematic observations from Study 1) the results showed that no single nurse or nursing aide could be depended upon to differentiate nonwanderers from wanderers. Moreover an index, based on a caregiver's answers to a number of questions, indicated the caregivers were not sensitive to quantitative differences in participants wandering behaviours. The overall conclusion was that neither the single direct question, nor the index based on multiple questions, matched the behavioural data closely enough to rely on any one caregiver's selection of subjects. A further caution is warranted. The statistics for evaluating screening measures suggest that the results might have been even worse if there had not been a high prevalence of wanderers in the SDAT population of the special wing. Thus researchers should be wary of depending upon caregivers to differentiate wanderers and nonwanderers in general nursing home populations where typically the prevalence of wanderers is below 20% (Rouse et al., 1986).

According to the results of Study 2, the validity of retrospective assessments of wandering behaviours would appear to depend upon the strategies adopted by the researcher. If the information from a number of caregivers is pooled to produce one data point for every item of interest, such as every item on a questionnaire, then retrospective studies would closely approximate observed behaviours. However, if instead of pooling information on each topic, the caregivers ratings are considered individually, then it is unlikely that any caregiver will accurately evaluate subject's behaviour. That suggests that in studies where each caregiver's information is considered individually the retrospective measurement is likely to be unreliable.

The next methodological issue arises from the main analysis used in Study 1. The implications of using event based probabilities with lag sequential analysis should be formally addressed. The fact that the number of units of behaviour in the coding scheme can influence the event based probabilities and therefore the results of a study is a fundamental issue. Yet the interdependence, or ipsative, qualities of event based probabilities have not been discussed by any of the books or book chapters written by the major proponents of lag sequential analyses and perhaps they have not been investigated (e.g. Bakeman & Gottman, 1986; Sackett, 1978a, 1978b, 1979, 1987). Jones' (1973) early concern with the implications of using event based probabilities has not been extended to this relatively new form of analysis. However, users need to know much more about the mathematical implications of dropping codes and combining codes when event lags are used. Are there mathematical reasons why lag sequential analyses based on event probabilities will not be comparable across studies in the same way one expects time based probabilities and analyses based on such probabilities to be? Although computer simulation seems an antithesis to naturalistic observation, simulation studies might be the most practical way to discover the effects of different sized coding schemes when using event analyses (e.g., Simpson & Simpson, 1977 but cf. Powell, Martindale, & Kulp, 1975).

Simulation studies might also be used to investigate another methodological issue that emerged in the present research. This was the use of hierarchical coding schemes. Jones (1973) expressed reservations about such schemes, but was primarily concerned with the use of hierarchical coding schemes with one-zero scoring of time samples (intervals are sampled and a count of one is given if a behaviour occurs, no matter how many times it occurred in the interval, zero being the count if it did not occur). However, it was evident in the present research, when the time budgets derived from Study 1 and Study 4 were compared, that a hierarchical coding scheme led to inaccuracies with instantaneous scans that would have been difficult to predict (or to estimate without having used continuous recording for the focal observations, cf. Appendix G). Because the literature is nearly silent with regard to the implications of using hierarchical coding schemes and because such schemes have been used in research that has had major social impact (Landesman-Dwyer, Stein, & Sackett, 1976), this has to be considered a serious gap in observational methodology. We must discover the nature of such biases so that we can correct for them in our interpretation of the data.

Why systematic observational research? Most of the reports on wandering are based on anecdotal evidence and unsystematic observation. This is the first observational study to use sequential analysis of behaviour. More studies of this nature would extend our current knowledge of the behaviour of persons with SDAT just as it has with the behaviour of children (cf. Bakeman & Gottman, 1986 and Hutt & Hutt, 1970). It is difficult to see how current management programs for wandering can be evaluated when wandering has not been well defined or fully understood. If wandering behaviour is such a problem that it calls for treatment with physical restraints and psychotropic drugs, even though they may have serious side-effects, then at minimum we should know which behaviours are precipitants of more dangerous activities and which behaviours are innocuous.

The nature of wandering behaviours and their causes may be important when considering coping strategies. If the wandering behaviours result from a need for excessive activity they may be amenable to exercise programs to use up the person's energy (Robb, 1985). However, if wandering behaviours arise from boredom they may be helped by a more stimulating physical environment and by cognitive orientation or other activities that stimulate the person's interest. Rouse et al. (1986) suggest, however, that very different strategies are needed when wanderers are determined to leave in pursuit of some specific but inappropriate objective (e.g. to go home or to work) because the intensity of their desire to leave may make them ignore normal warning cues such as door buzzers. Recent research on other strategies such as floor patterns that demented persons hesitate to cross and door monitors that respond with individually tailored, voiced warnings may provide better solutions (e.g., Hussian & Brown, 1987; Martino-Saltzman, 1988; Rouse et al., 1986).

Implications for Management Strategies

A number of the findings in the present research have implications for environmental controls within institutions, the behavioural management of wandering behaviour by the staff of long-term care institutions, regulatory policy, legal responsibility, and regulations which govern the freedom of nursing home residents. Some of the results counter the prevailing lore about persons with SDAT who spend much of their time in restless locomotion.

An improbable cause of absconding. An unanticipated result was the fact that there was no significant difference between the number of nonwanderers and the number of wanderers who absconded from either the second floor of the nursing home or the facility. Additionally, the relationship that has been assumed to exist between absconding and restless locomotion was not well supported. For example, when the behaviour was the unit of analysis rather than the individual, no strong evidence was found for the assumption that restless locomotion has a high probability of evolving into an absconding incident. Therefore, the notion of a strong association between these activities should be reevaluated and management strategies should be adjusted.

Although the results need to be replicated, if nonwanderers who are demented are at the same risk of absconding as wanderers, then caregivers' efforts to restrain wanderers seems futile. The notion of an association between restless locomotion and absconding has been the basis for arguments that wanderers must be restrained for their own protection. Finding that restless locomotion does not necessarily lead to absconding, does not only affect *arguments* for applying restraints, the results have the potential to affect nursing home regulations that permit restraint on the basis of the resident's style of locomotion and laws that permit regulations that control the freedom of movement of nursing home residents. Such regulations, if not the laws themselves, need to be examined if other studies support the results of Study 1 and Study 3.

Adverse affects of restraint and alternative care. Restraints have usually taken the form of drugs in sufficient doses to inhibit locomotion and the use of multiple body restraints (Blakeslee, 1988; Miller, 1976; Pynoos & Stacey, 1986; Risse & Barnes, 1986; Stilwell, 1988). Surprisingly, these severe measures are used even though we know very little about wandering behaviours. In addition we know that walking has many positive health benefits such as oxygenation of blood, stimulation to circulation, promotion of elimination in the gastro-intestinal system, reduction of stress, and we know that independent walking increases freedom, a sense of control, and augments personal dignity (Heim, 1986). Moreover, walking might help the poor oxygenation of the blood, poor circulation, and poor elimination that have been suspected of producing confusion in the elderly and, therefore, of augmenting dementia (Zarit & Zarit, 1982). The loss of a sense of control also has been implicated in the diminished cognitive capacities of elderly persons who are institutionalized (Winocur, 1985). An extensive body of research has shown that cognitive performance is highly dependent on stimulus and contextual conditions (cf. Lawton, 1975, p. 61). Moreover, diminished environmental stimulation has been shown to increase the confusion of demented persons (Cameron, 1941). Immobilized people, kept still for long periods by restraints or drugs, would be expected to have diminished environmental stimulation. Thus, it can be argued that demented persons, like other elderly persons, can benefit both physically and cognitively from exercise and from the stimulation that results from moving in one's environment.

Some evidence suggests restraint may have some counterintuitive results that are diametrically opposed to the purposes intended, that is to *protect* the demented resident. Cape (1983) found hospitals that used fewer restraints had about half the accident rates of equivalent hospitals that employed more restraints. The severe measures to restrict wandering behaviours may have developed because wandering behaviours are associated, perhaps unjustly, with many of the serious accidents and deaths that occur in dementia (Branzelle, 1988; Buchner & Larson, 1987; "Lost", "My name", 1987). Doubt is cast on this association by recent reviews that have suggested restraints may lead to more deaths and accidents than the wandering behaviours they are intended to inhibit (Branzelle, 1988; Cape, 1983; Katz et al., 1981).

A number of studies have shown positive behavioural results can accrue for demented persons from treatment programs that have discarded restraints, encouraged walking and even permitted absconding from the institution under the watchful eye of a staff member who did *not* coerce the resident to return (Blakeslee, 1988; McGrowder-Lin, & Bhatt, 1988; Rader, 1987; Rader et al., 1987; Robb, 1985; Rosswurm et al., 1986; Stilwell, 1988).

Possible forewarning of absconding. If restless locomotion does not evolve into absconding, what does precipitate it? Observers' descriptions, supported by the data they collected in Study 1, and caregivers' reports in Study 2, suggested that much of the absconding from the floor, and from the facility, was a function of opportunity. If an SDAT participant was in the vicinity and the elevator doors opened or the front door opened the participant might go through the open door and thus abscond. In such cases there might not be appear to be any forewarning of absconding, and for some individuals that might be true, but the analysis of the behavioural sequences indicated significant links between trespassing, absconding from the room, absconding from the floor, and fiddling. This was evident in both groups of wanderers. Although some caution is warranted when accepting relationships between behaviours that occur very infrequently, trespassing in other residents' rooms was found to be significantly associated with absconding from the nursing home's top floor. Thus, trespassing could be taken as an indication that these participants might abscond. Absconding from rooms or activities, like trespassing, appeared to be a potentially useful signal because it was significantly implicated in the patterns for both absconding from the floor and for trespassing. Fiddling was found to be a very persistent behaviour for all SDAT participants. It intruded at significant frequencies in many behavioural patterns, which makes it a less valuable harbinger of absconding from the floor but it appeared to frequently presage absconding from the room or an activity. These results suggest caregivers might consider absconding from the room and trespassing as harbingers of absconding from the floor.

There is a lesson for caregivers in one incident described in some detail in Study 1 where a wanderer absconded to a lower floor. The wanderer was apprehended by staff and returned to the lounge of the special wing but he promptly returned to the central area of the ward and then trespassed in another resident's bedroom. This suggests that a caregiver should remain after returning with an absconder if there is to be any assurance that further incidents of a dangerous nature will not occur. This sort of strategy is recommended on other occasions when the caregiver might be viewed as interfering with a demented resident's plans (Rader, 1987; Rader et al., 1987).

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Footnotes

[1] Personal communication.

APPENDIX A

BACKGROUND AND OPERATIONAL DEFINITIONS OF SEVEN WANDERING BEHAVIOURS AND PURPOSIVE LOCOMOTION[2]

Purposive Locomotion

Purposive locomotion is included here, although it was not considered a wandering behaviour, because it was the default code for locomotion. The default code was the code applied when the context information was insufficient to determine whether an instance of locomotion was "wandering" or not. Purposive locomotion was chosen as default because the chief concern of this research was wandering behaviours, which made it preferable to have overly conservative estimates of time spent in wandering styles of locomotion rather than inflated estimates.

Meacher (1972), in observing demented residents in six geriatric facilities, was able to distinguish three types of locomotion: purposive walking, and both aimless and directed wandering. Purposive locomotion, he said, has an obvious purpose and an apparent destination. Other observational studies of wandering behaviours have evidently considered all locomotion of the persons designated as wanderers to be wandering. Realistically, one might expect that they would occasionally go to their room to toilet themselves, or go to their ward lounge to sit. This type of walking was considered purposive in this study. Thus the code for ordinary walking (code 51) was considered purposive locomotion when the trip had an obvious destination and the participant remained at the location. The purpose may have been merely to sit in a customary location. All the following were used to determine whether the locomotion was classified as purposive or not: the location where ordinary locomotion began, the duration of the locomotion, and the end location. For example, because all meals and nearly all activities for those with Alzheimer's disease occurred in the lounge of their ward, trips between their rooms and the lounge were classified as purposive if the trip occurred no more than twice (once each way) during an observation session (10 minutes). If trips were repeated the locomotion met one of the definitions of wandering below.

Purposive is meant in the sense that the walking had an evident purpose, because it was considered useful to differentiate such walking from types of wandering locomotion. Purposive is not used in the sense that the purpose was formulated and thoughtfully carried out by the SDAT participant. In most cases when a participant in locomotion was being escorted by a staff member (compliant walking, code 54), it was considered purposive locomotion. The staff member may have provided the purpose, nevertheless, the locomotion had purpose and therefore was not a wandering behaviour. Again, the origin of compliant walking, the duration of the locomotion, and the end location were all used to determine whether the (code 54) locomotion was classified as purposive or not. Observers' comments, however, were used to interpret codes. For example, compliant walking (code 54) was not considered purposive locomotion if the observer recorded that the participant was being retrieved by a staff member from a location that was out of bounds or that the participant was being returned to a room or activity from which he/she had absconded. However, the inference that the participant had absconded or had made a wayfinding error was not made unless (1) the absconding or wayfinding error was evident through the selection of codes or (2) the observer's comment made explicit reference to the event.

Wandering Behaviours

There is no consensual definition of wandering. Seven component behaviours of wandering were derived from descriptions or definitions of wandering provided by other writers. All seven could be operationally defined (1) by using or combining behaviours in the original coding scheme, (2) by using other dimensions of the data, such as verbalizations or awareness levels, or (3) by using supplementary information provided by the coders. Thus I operationalized wandering as the following behaviours: *three levels of absconding*--from rooms/activities, from the floor of the nursing home, and from the institution itself (cf. Burnside, 1980; Cornbleth, 1977; Hussian & Brown, 1987; Martino-Saltzman, 1988; Oberleder, 1976); *restless locomotion* (frequent locomotion with no obvious purpose and no apparent destination, Meacher, 1972); *group walking* (Hussian & Davis, 1983, cited in Hussian & Davis, 1985); *fiddling*, a term for the fiddling and fidgeting movements noticed by Meacher (1972; cf. Snyder et al., 1978) as well as the stereotypic behaviours observed by Hussian and Davis (1983, cited in Hussian & Davis, 1985); being lost and/or having *navigational difficulties* (Burnside, 1980; de Leon et al., 1984); *searching* (Monsour & Robb, 1982; Snyder et al., 1978); and *trespassing* into other individuals' private territory (Martino-Saltzman, 1988; Rosswurm et al., 1986).

The operational definitions of seven wandering activities are:

1. *Absconding/escape from a room, nursing unit, or building*: One of the most prevalent assumptions about wandering is that it is locomotion to an abnormal degree (Meacher, 1972). The distance attained and the location reached communicates much about a wanderer's disregard for social conventions and safety measures. The different distances attained provide some measurement of the extent to which the wanderer has been exposed to danger. Thus the distance covered by participants, the location of the locomotion, and the frequency of their locomotion are considered important in the following definitions.

When a participant absconded, that is, when an escape, elopement, exodus or hegira (a journey taken to escape from an undesirable situation) was effected, there appeared to be at minimum three levels of distance, or three levels of locations, that were important to nursing staff (Farley, 1985, Meacher, 1972; Snyder et al., 1978). Demented residents' absconding from the institution was of primary importance. Of secondary concern was demented residents absconding from the areas to which they were officially confined (in the nursing home of this study the demented residents who were housed in the special wing were officially confined to the second floor and were routinely accompanied on trips to and from other floors). Another level of absconding occurred when demented residents absconded from the ward, room, or activity where they were expected to remain (those who were housed in the special wing were unofficially confined to that wing, prior to meals they were unofficially confined to the lounge where they were served meals, and when put to bed they were unofficially confined to their bedrooms--

escape from the latter two situations typically prompted caregivers to retrieve the absconders, but confinement to the ward was primarily prompted by complaints from administrative staff or other residents).

All levels of absconding could be part of an observational session because observers would follow but not intercede in any way when a participant absconded. The operational definition of absconding from the nursing home was a departure, when not accompanied by a responsible adult, through a doorway to the exterior (i.e., main floor front and service exits and first floor patio exits). Absconding from areas to which demented residents were officially confined was operationally defined as an unaccompanied departure from the second floor. On occasions when the participant left a meal before it was finished, or just before it was served, or left her or his bedroom after being put to bed, or left the special wing after the majority of other persons on the special wing had gone to bed, then the behaviour was considered absconding from a room and/or activity (where the participant was expected to remain). Such incidents were evident from the observers' written comments, noting, for example, that the participant was leaving the meal area during his or her mealtime, or leaving his or her bedroom after being bedded for the night.

Incidents of absconding, however, could also be determined from a count of the number of times that a participant could not be found when he or she was to be observed (i.e., his/her code appeared next on the randomly ordered list of participants to be observed). These were considered absconding from an activity because for a minimum of 10 minutes, during which when the observation was to take place, the observer searched the floor (looking in all rooms with open doors, but not opening doors) for the missing participant and ascertained whether the she or he had been escorted elsewhere (similarly, Dawson & Reid, 1987, used the actual number of times a person was lost to nursing staff for more than 10 minutes as one measure of wandering). It is probable that the participant was trespassing in some private bedroom behind a closed door, however, that could not be verified. The participant was at minimum absconding from an activity. That was more probable than another level of absconding, because if the participant had left the floor or building the fact would have been noted by the observer in her daily notes. Absconding from the building was rare enough that the event was announced on the public address, discussed by nursing staff and possibly entered on the participant's nursing chart. Absconding from the floor caused less concern but nonetheless received considerable attention on the day that it happened.

2. *Lost/navigational difficulties*: Lost is used in the sense of being disoriented with regard to direction (Burnside, 1980; de Leon et al., 1984). It does not refer to the nursing home staff or the observer being unable to locate the participant. Operationally, having navigational difficulties and/or being lost was demonstrated by the participant visually scanning the environment at a choicepoint (whether the participant was walking, code 48, or standing during the scan, code 61). If the observer's comment noted that a participant made an error at a locational choicepoint the participant was considered to be having navigational difficulty. For example, one participant had previously occupied a room on another ward and she

occasionally entered that room when in that hallway. Her entry into that room was considered a navigational error rather than trespassing. Similarly, on occasions where participants opened doors but no entrance occurred (and the observer noted this), participants were also considered to be having navigational difficulties. A specific code (18) was used to note instances when the participant received help with wayfinding. If the participant requested wayfinding information observers used a different code (13) with a written comment.

3. *Restless locomotion*: Wanderers are considerably more active that nonwanderers (Dawson & Reid, 1987; Snyder et al., 1978). Their locomotion has been described as a compulsive activity with no obvious purpose and no apparent destination (Meacher, 1972). Descriptions of wandering locomotion typically include the word aimless (Meacher, 1972); Wood, 1986). The term aimless is criticized, however, because (1) it implies a value judgement (Hiatt, 1980) and (2) wandering locomotion has been judged to have purpose on occasions when the observer has some contextual information, although the purpose may not have been evident to a casual observer (Burnside, 1980; Rader et al., 1985). Therefore, the preferred term in this study is *restless* locomotion rather than aimless locomotion. Restless locomotion was defined as locomotion that repetitively covered the same ground and had no obvious purpose. It typically occurred in places considered inappropriate for such activity and/or at inappropriate times. Restless locomotion was operationally defined as a walk in which a proportion of the location codes were repeated (because no participants were in wheelchairs, this

definition was not broadened to include analogous wheelchair movement cf. Burnside, 1980, 1981; Hiatt, 1988). For example, normal locomotion (code 51) which involved many locations or which had specific trips repeated was considered restless locomotion. A characteristic shuffling gait (code 59) that was occasionally exhibited by some participants was included in restless locomotion on the basis of pilot observations that indicated it was a component of these participants' undirected locomotion. General movements (code 53), because they were transitional adjustments, were considered part of the sequence of movement they preceded, thus when the subsequent locomotion was restless locomotion prior instances of general movement were recoded as restless locomotion.

4. *Fiddling or stereotypic movement and unusual handling of objects*: Other observational studies have noted that demented persons have high rates of restless motor behaviours and reported that these were a component of wandering behaviours. Meacher distinguished some subjects who did not incessantly walk, but were physically restless. That is they engaged in frequent getting up and sitting down and/or fidgeting with any available objects or their clothes (Meacher, 1972, p. 130). He suggested this general restlessness might supplant wandering. Dawson and Read (1987#1173) and Snyder et al. (1978) found that persons who engaged in restless locomotion to an abnormal degree sometimes also exhibited a general physically restless (i.e., frequently tapping and otherwise moving their extremities, industriously handling or fiddling with objects, and picking at garments). Hussian and his co-workers (Hussian & Davis, 1985; Hussian & Hill, 1980) noted that some wanderers had

stereotypic behaviours (examples given by Hussian & Hill, 1980, were repetitive picking, rubbing, vocalizations, manipulation and a peculiar sanding hand movement). On the basis of these observations restless activity or fiddling was included as a wandering behaviour.

Fiddling was defined as stereotypic movement, the unusual handling of objects (the repetitive picking, rubbing, or manipulating of objects including the persons' hands and feet) and fidgeting movements. The following behaviours were included in the operational definition of restless activity: stereotypic repetitive hand and body movements (code 12), repetitious acts (code 13, if the observers comment recorded the act),inappropriate object use or object manipulation (code 15), inappropriate gathering of objects (code 16), and fidgeting when the restless movement was not preparatory to either locomotion or sitting and was not related to searching (code 53). Additionally, when the code for idiosyncratic unusual behaviour was used without the observer's comment to indicate the specific behaviour, then it was considered fiddling (code 29 for idiosyncratic unusual behaviour was typically used for movements that were unique to the participant such as a motion simulating the wood-planing of a handrail, but could be used for something that did not fit elsewhere such as a participant defecating on the floor).

5. *Searching*: Searching has been considered a component of wandering behaviours particularly when it is the pursuit of indefinable or unobtainable goals (Monsour & Robb, 1982; Rader et al., 1985; Snyder et al., 1978). Snyder et al. (1978, p. 275) considered "overtly goal-directed/searching behaviour" a distinct type of wandering behaviour. Observers in the present study,

however, noted in pilot research that demented participants conducted lengthy searches for objects that were considered attainable. Frequently the goal was stated as participants rummaged through closets, cabinets, handbags, and other containers for lost eyeglasses, false teeth, sweaters, etc. Therefore, in this study searching was defined as the pursuit of attainable goals. It was characterized by a goal-directed inspection of receptacles that typically hold objects used by the participant. Searching for dead relatives, children who had long since grown up, or past homes was considered delusional behaviour and was classified an unusual behaviour.

The original coding scheme included a specific code (20) for instances where the participant received help searching for an object. Those instances were counted as searching. As well, if the observers' comments indicated that the participant was engaged in a search throughout a series of codes such as the code for standing and searching/scanning (61), those codes and any intervening general movement codes (53) were considered searching behaviours. Looking for attainable locations, however, was included as a component of navigational difficulties. If the search was conducted in a private bedroom other than the one in which the participant lived it was considered trespassing rather than searching.

6. *Trespass*: Trespassing was defined as entry into other individuals' private territory, that is the participants' entry into, or occupation of, another's bedroom when the participant is not accompanied by staff or invited by the occupant. This is considered one of the dangerous wandering activities because the wanderer may

become the object of aggression as a result of the trespassing (Hiatt, 1988; Maxwell, Bader, & Watson, 1972; Meacher, 1972). Operationally, trespassing was determined through the locational codes in the coding scheme because they provided a means of identifying a participant's entry into another person's private bedroom.

7. *Restless group walking*: The only reference in the literature to group walking or anything analogous is Hussian and Davis' classification of some wanderers as "modelers". Modelers were described as individuals who tended to walk only in the presence of another walker (Hussian & Davis, 1983, cited in Hussian & Davis, 1985).

Group walking was defined as restless locomotion by two or more residents. Operationally, this behaviour was identical to the code for group walking (code 52) in the original coding scheme. Whenever the participant was involved in restless locomotion with one or more other residents and was not being escorted to a location by a staff member, the locomotion was coded as group walking. Typically the participant was arm-in-arm or hand-in-hand with another demented resident. The code (code 52) was not used for participants walking with only relatives or staff members. Pilot research indicated that group walking was an unusually obtrusive behaviour in the nursing home that could continue for some period of time.

Although other researchers have distinguished subcategories of locomotion which they termed directed and aimless (Meacher, 1972,), or have seen evidence of "agenda behaviour" in the locomotion (Rader et al., 1985), it was not considered possible to reliably distinguish these in the present study. Similarly, pacing was not differentiated as a distinct form of wandering locomotion (Heim, 1986; Lawson et al., 1977).

[2] Full definitions of other behaviours are in Appendix D.

APPENDIX B

MEDICATIONS TAKEN BY PARTICIPANTS[3]

SDAT Participants

Participants[4]			Daily Medications
			Antipsychotic Drugs
N	0.75	mg	haloperidol
S	0.2	mg[5]	haloperidol
T	0.6	mg	haloperidol
L	30.0	mg	thioridazine HCL
P	40.0	mg	thioridazine HCL
			Antianxiety Drugs
M	37.5	mg	oxazepam
L	0.5	mg[6]	lorazepam
P	6.0	mg[7]	lorazepam
E	1.5	mg	lorazepam
			Antidepressants
H	12.5	mg	trimipramine
M	75.0	mg	doxepin
N	20.0	mg	doxepin
S	25.0	mg	doxepin
			Sedative / Hypnotics
E	500.0	mg	chloral hydrate
G	500.0	mg	chloral hydrate
N	500.0	mg	chloral hydrate
P	500.0	mg	chloral hydrate
T	500.0	mg	chloral hydrate

Analgesics and Anti-inflammatory Agents

L	600.0	mg	ibuprofen
M	160.0	ml	acetaminophen
I	160.0	ml	acetaminophen
P	650.0	mg[8]	acetaminophen
E	640.0	mg	acetaminophen
N	500.0	mg	naproxen
N	750.0	mg	acetylsalicylic acid

Diuretic / Antihypertensive

G	160.0	mg	furosemide
P	75.0	mg	triamterene-hydrochlorothiazide

Specific Agents

G	2.5	mg[9]	insulin (diabetes)
L	0.1	mg	l-thyroxine (hypothyroidism)
P	0.1	mg	l-thyroxine (hypothyroidism)

[3] All SDAT participants and all high-functioning participants were given laxatives. They are not listed.

[4] The single initials are codes used for the 10 SDAT participants. Participant I was not on any psychotropic medication.

[5] Given 0.2 mg at bedtime for only 3 days of the study.

[6] Given for only 4 days prior to study..

[7] This is a maximum suggested dosage. She was given 3 mg three times per day, for 2 weeks only, prior to the study.

[8] Given for two days of the study.

[9] Insulin prescribed 2.5 months before study began.

High-functioning Participants

Participants[10]			Daily Medications
			Antidepressants
FN	45.0	mg	doxepin
FN	125.0	mg	trimipramine
ML	50.0	mg	amitriptyline HCL
NL	10.0	mg	doxepin HCL
WD	25.0	mg	amitriptyline HCL
			Sedative / Hypnotics
AN	500.0	mg	chloral hydrate
BN	15-30	mg	flurazepam HCL
NL	1-2	mg	lorazepam
RY[11]	500.0	mg	chloral hydrate
WD[12]	0.25	mg	triazolam
			Analgesics and Anti-inflammatory Agents
AN	1200.0	mg	acetaminophen
AN	200.0	mg	ketoprofen
AN[13]	500.0	mg	naproxen
BN[14]	975.0	mg	acetaminophen
FN	260.0	mg	propoxyphene napsylate
JT	1800.0	mg	ibuprofen
JT	300.0	mg	propoxyphene napsylate
MY	1300.0	mg	acetaminophen
WD	1300.0	mg	acetaminophen
			Anticonvulsant
FN	200.0	mg	phenytoin

WD	200.0	mg	phenytoin
	Diuretic / Antihypertensive		
BN	50.0	mg	triamterene-hydrochlorothiazide
JT	75.0	mg	triamterene-hydrochlorothiazide
ML	75.0	mg	triamterene-hydrochlorothiazide
MY	75.0	mg	triamterene-hydrochlorothiazide
NL	75.0	mg	triamterene-hydrochlorothiazide
NL	500.0	mg	methyldopa
RY	50.0	mg	triamterene-hydrochlorothiazide
	Cardiovascular		
AN	75.0	mg	dipyridamole
ML	1200.0	mg	potassium chloride
MY	400.0	mg	disopyramide
RY	600.0	mg	potassium chloride
	Muscle Relaxant/Parkinson's disease		
BN[15]	15.0	mg	cyclobenzaprine HCL
ML	75.0	mg	dantrolene sodium
MY	385.0	mg	levodopa-carbidopa
MY[16]	1.25	mg	bromocriptine mesylate
	Gastrointestinal		
AN	300.0	mg	cimetidine
BN	15-20	mg	metroclorpramide
MY	80.0	ml	simethicone
MY	300.0	mg	ranitidine HCL
NL	20.0	ml	simethicone
NL	150.0	mg	ranitidine HCL
RY	20.0	ml	simethicone

Specific Agents

BN[17]	3.0	mg	ergoloid mesylates (cerebral insufficiency)
JT	900.0	mg	ferrous gluconate (anemia)
ML	900.0	mg	ferrous gluconate (anemia)
WD	2.5	mg	pteroylglutamic acid (anemia)

[10] The double initials are codes used for the 9 high-functioning participants. None of these participants were using antipsychotic or antianxiety drugs.

[11] Given for Aug. except Aug. 27, 29-31.

[12] Given for Aug. except Aug. 2-8, and Aug. 11.

[13] Discontinued one week before the study began.

[14] Given as necessary, but with a few exceptions given throughout July and August.

[15] Given only for 25 days 2 months prior to the beginning of the study.

[16] Given for 5 days only during second week of the study.

[17] Given only for 25 days 2 months prior to the beginning of the study.

APPENDIX C

CODING SCHEME FOR FOCAL OBSERVATIONS

SAMPLING THE BEHAVIOUR OF INSTITUTIONALIZED PERSONS WITH CONTINUOUS RECORDING OF DATA[18]

OBSERVER'S INITIAL COMMENTS: Initial subject situation.

I. LOCATION (A coded version of the facility map was used by observers. It had 174 codes and is not provided. The function of the location was used to condense the codes for analyses. The general floorplan is Figure 7 of the dissertation.)

II. ACTIVITY

NIL BEHAVIOURS

00 not found

01 left nursing home

02 can't observe

09 other reason * specify what

UNUSUAL BEHAVIOURS

12 stereotypic

13 repeated * specify what

14 delusion/hallucination

15 inappropriate use of object

16 gathering * specify what

17 mimicry/echolalic utterances

18 wayfinding help

(+ verbal, - physical, +_ both)

20 help finding an object

(+ verbal, - physical, +_ both)

29 other * specify what

SOCIAL

31	initiate, OR try to initiate (appropriate)	
32	continuing	(+ positive, - negative)
33	inappropriate (+ positive, - negative)	
39	*other*	* specify what

ACTIVE (APPROPRIATE)

41	symbolic	(be conservative)
42	self-generated	(not care behaviours, be conservative)
43	external	
44	object use	(- unexpected quality)
45	cued object use	
46	self care	
47	cued care	
48	walk-search/scan	(+ head up, - head down)
51	walking	(+ head up, - head down)
52	group walking	
53	general movement	(any other)
54	compliant walking	
55	total care	
56	self-movement in a wheelchair	
59	*other*	* specify what

INACTIVE

61	stand-search/scan	(+ head up, - head down)
62	stand	
63	sit	
64	dozy	
69	*other*	* specify what

III. VERBAL LEVEL (5 sec)

VOLUME: (- whisper, + loud, ! yell)

0	none	
1	inappropriate [19]	
2	discontinuous	
3	informative	
4	conversational	
5	not understood (i.e., foreign language)	
9	*other*	* specify what

IV. AWARENESS LEVEL

0	unaware	(demonstrated)
1	not-selective	(demonstrated)
2	observing observer	(demonstrated, + you're positive)
3	aware	(default level; specify if looking out window)
9	*other*	* specify what

V. SUBJECT CODES

SDAT Subjects:

G	(female)	P	(female)
H	(female)	E	(female)
L	(female)	N	(female)
M	(female)	S	(male)
I	(female)	T	(female)

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[18] The hierarchical list of behaviours was chosen in consultation with Dr. B. G. Rule and Dr. A. R. Dobbs for an exploratory study of the institutional behaviour of demented persons. The exploratory study

was supported by a grant from Alberta Senior Citizens' Bureau to Dr. Dobbs and Dr. Rule and a grant to the author from the National Sciences and Engineering Research Council of Canada.

This coding scheme is based on an earlier version by the author and A. L. Milke composed, for training purposes, for use with instantaneous scans (cf. Appendix I). The format was derived to an large extent from a coding scheme used for retarded adults by Landesman-Dwyer et al. (1976) although only one section of their scheme was hierarchical. Full definitions of the behaviours in the coding scheme are in Appendix D.

[18] Verbal codes 1 & 2 were combined for all analyses because of poor interobserver reliability.

APPENDIX D

DEFINITIONS FOR THE (ORIGINAL) CODING SCHEME USED FOR FOCAL OBSERVATIONS[20]

I. Background Information

A. General Procedures and Information

1. Scoring is initiated by the observer each time there is a change in any one of the following dimensions *locations*, *activities*, *verbal communication levels*, and *awareness levels* (the term *dimension* is reserved in this appendix for the superordinate level of the behaviours; a *category* refers to a class of behaviours within a dimension). Within each dimension the codes represent mutually exclusive (only one can be scored at any one time) and exhaustive (no time can pass without a codable event occurring) categorization of all possible events in which the focal subject can engage. Each event is assigned a distinctive number code. Although some of the codes, in the *activities* dimension for example, could occur at the same time, a priority system provides a set of rules concerning precedence relations among the codes (cf. Bakeman & Gottman, 1986.

The *activities* dimension has many descriptive levels within it. The levels represent different categories of activities and they are hierarchically ordered. Thus the categories listed first have precedence over the categories that follow them: 1) *unusual* behaviour, 2) *social* interactions, 3) *active* and 4) *inactive* behaviours. Although it is possible for behaviours across these categories to occur simultaneously, the rules for coding are that the behaviour in the preeminent category is coded in preference to the behaviour in a category that is lower in the hierarchy. For example, an *active* behaviour (walking) can occur in conjunction with a *social* behaviour (initiating a conversation), however, the coding rules specify that the *social* behaviour is the one recorded. In practice, if a behaviour with a smaller number code occurs in conjunction with a behaviour with a larger number code, then the behaviour with the smaller number code is the one scored. This means that if an *unusual* behaviour is scored by using one of the cluster of codes listed under that heading in Appendix C, then no other code in the *activities* dimension may be used even though the behaviours occur concurrently. In this coding scheme unusual behaviours were given the highest priority and the smallest number codes (thus the coding scheme is especially sensitive to unusual behaviours). Within each category in the *activities* dimension the codes are either inherently, or are defined to be, mutually exclusive and exhaustive. Thus, the *inactive* behaviours standing and sitting are inherently mutually exclusive, whereas, the *social* behaviours of initiating interaction, continuing interaction and inappropriate interaction are defined to be mutually exclusive. Some codes (codes ending in 9s that are used for miscellaneous behaviours in each category) are exceptions to the hierarchical ordering. They do not take precedence over other more specific codes (their use is explained below).

Similarly, the codes in the dimension for *verbal communication levels* are hierarchically arranged. A smaller numbered code is given priority when a code with a larger number occurs in conjunction with it. The codes in the dimension for *awareness levels*, however, are *not* hierarchically arranged. Instead, the participant is assumed to have a normal awareness level unless there is evidence otherwise. The various levels should be demonstrated.

In some dimensions and categories the behaviour code has a qualifying symbol which is scored with the code. For example, under *verbal communication levels* volume is to be entered with a code by using a +, -, or !. Such qualifiers reduce the number of codes that are necessary (e.g., under verbal levels the number of codes necessary to capture the same information would be 5x3, or 15 codes). To score these qualifying codes enter the symbol immediately following the number code. For example, when verbal communication occurs, the observer first enters the appropriate code number, then ! if the utterance is yelled.

2. By using mutually exclusive and exhaustive behaviours the onset of one behaviour marks the offset of another, thus the duration of all behaviours are coded as well as the frequencies that occur within the observational period sampled. The microcomputer automatically stores the time elapsed since the last code with each new entry. However, because a change of behaviour in any dimension requires an entry for that dimension, it also requires entries in all dimensions of the codes for behaviours that are continuing in those dimensions. Thus each change in behaviour generates a line in a computer file (visible to the observer on the microcomputer screen) and duration of any code is obtained by summing the periods of elapsed time across each dimension until a new code appears.

3. For some behaviours the duration determines whether a new event has occurred or not. Thus if a verbal utterance ceases for more than a certain set period of time it is scored as a new event when it occurs again. A 2 sec duration has been used for determining children's new verbal utterances (Porter, Ramsey, Tremblay, Iaccoba,

& Crawley, 1978, p. 328), however, because behaviours of Alzheimer patients generally occur at a slower pace the duration was set at 5 sec. Thus, if a 5 sec pause occurs in any of the participants' verbal communications, it is scored as another utterance (#32).

Similar rules have been established for other behaviours. If stereotyped body-movements (#12, hand-wringing, hair-twisting, etc.) do *not* persist for a minimum 10 sec duration they are ignored. In the same manner this code (#12) is used for other motor repetitions such as when a behaviour continues for 10 sec and thus is *unusual* because of the participant's persistence in it when it has no functional value. An example is an activity such as stroking/feeling a table. If done for less than 10 sec the observer ignores the movement, but if it persists the observer scores it for the first time after it has persisted for 10 sec. There is also a time parameter applied when an appropriate behaviour persists. For example rearranging chairs at a table is scored as *general movement* (code #53 would be used because moving and then adjusting a chair is often part of the transition between sitting and movement away from the location), but when it continues for 10 sec (arbitrarily judged to be a functional limit) then it is then scored as *inappropriate object use* (#15). *Sitting, inactive* (#63) and *asleep or dozing* (#64) require 5 sec duration to switch from one score to the other. That is, if a participant does not remain asleep or dozing for more than 5 sec the participant is not scored as dozing (#64) and the previous *activity* code is not changed (usually *inactive sitting*, #63). Similarly, if a participant who is *sitting and dozing* does not remain awake for more than 5 sec the previous code is not altered and the participant is still scored as sitting, inactive (#63).

4. If the participant is asleep, other dimensions will be scored as having no behaviour (i.e., the 0 code will be used under *verbal communication levels* and under *awareness levels*). If the participant is unobservable, other dimensions generally will be scored as being unknown (i.e., the 9 code will be used under *verbal communication levels* and under *awareness levels*) unless the observer has clear information that another code is more appropriate.

5. In general, the preference is to under-interpret the participant's behaviour rather than over-interpret it. Thus, when the participant is seen thumbing through a magazine the behaviour is not considered to be *focused symbolic activity*, unless there is evidence the participant has comprehended the activity. Similarly, when the participant is seen watching TV the behaviour is not considered *focused self-generated activity*, unless there is evidence some evidence the participant has generated the activity.

6. The participants are observed at all the locations that they frequent within the institution with a few exceptions such as when residents were behind closed doors in lavatories, bathtubs, and in their bedrooms when it was evident that privacy was desired (for example, when relatives were visiting or a treatment or examination was in progress). Residents are not followed into their rooms, but the observer can determine the activity in most instances when the room doors are open because the entire room is visible from the hallway (toilets are not visible, but the behaviour in the closet housing the toilet can be judged to be focal activity by sound and

context because the size of the closet restricts its uses; cf. Gottesman & Bourestom, 1974).

Should the participant be unavailable or become unavailable during the session, then a code would be entered from the *nil* category of the *activities* dimension. When the participant is being sought to begin an observation session and the participant's door is closed the observer is to knock, open the door, and, if the participant is present, use the information obtained by opening the door as the first behaviour codes for the session. The observer then retreats to the hall and uses *nil* code 02. If the participant reappears during the observation period, normal coding is resumed.

When the participant remains behind closed doors, the observer may knock on the door, ascertain the behaviour, then return to the hall but this cannot be done often. During the time that the participant's behaviour is unobservable that activity code normally will be used. The observer waits in the hallway until either the participant appears, or the observation session ends.

7. A comment is used to write a brief note to elucidate a behaviour or the context of a behaviour. For example, a comment provides a means of recording why the participant is unobservable. For some behaviour codes the observer is expected to provide particular information. Thus, comments are mandatory when codes ending in 9s (the codes for miscellaneous behaviours) are scored for any category. The microcomputer will automatically enter a number when codes ending in 9s are scored but observers can also request a comment number from the computer. The computer will provide a number (with an asterisk in the final column of the line in the computer

file) for each comment, beginning with number 1, and augment the number by one for each successive comment. The comment is written on paper (a Postit pad) with the appropriate number preceding it.

A comment must be entered if the participant is physically restrained in some way, by a staff member or mechanism, so that free movement is difficult. Examples of restraint are being belted into a wheelchair, being confined by a tray affixed to a geriatric chair[21], or confinement by some other means such as participant's arms being bandaged to chair arms. The observer must request a comment number from the computer in order to provide a comment regarding restraint.

8. Immediately prior to initiating coding for each observational session the observer should record as a comment: the setting event, such as the presence of other people at the same table as the participant, whether a meal is being eaten, etc.

9. The microcomputer signals when the 10 minutes allotted for each observational session has passed. The observer then must reenter the codes currently in use for each dimension to signify that the session has ended and to close the computer file for the session.

B. Rationale for Number Coding within Dimensions

1. Code 0 is reserved for none of a category or the equivalent of none.

2. The final code in a dimension (e.g. *activities*), or within a category of a dimension (e.g., *unusual*, within *activities*), ends with a nine, (i.e., 09, 19, 29 etc.) and is reserved for miscellaneous behaviours of the category or dimension. These codes assure that each category (and therefore each dimension) is exhaustive by providing a miscellaneous code to score any behaviours that are not

included within the definitions for the category or dimension. By using these 9-codes with a comment, it is possible to code any specific behaviour that could occur. For example, an unusual idiosyncratic behaviour can be coded by using code 29 under the *unusual* category with a comment to indicate the specific act.

II. The Information Recorded Before and During an Observation

1. *Qualitative* information entered immediately prior to a particular observational session. Initial entries (on paper, e.g., a Postit) include a) *the observation code* (see description below), b) *the day's situational changes*, such as any events reported by caregivers relevant to the participant or a prior event that may affect the participant's behaviour (e.g., an altercation with another person), c) *the participant's initial situation*, beginning with a comment on whether the participant is restrained or not, and including the proximate setting events (i.e., for the immediate table or chair, e.g., a foot bath being given, a meal being served) and distal setting events (within the entire room, e.g., the presence of visitors and/or staff members, a sing-song being conducted etc.) that may influence behaviour. Subsequent entries (on paper, e.g., a Postit) are made as comments are required by the coding rules or as observers wish to provide comments.

2. *Quantitative* data begins with an initial entry of the *observation code*. The observation code includes the participant's identification number (these codes are provided separately); the observer's identification code and whether it is the observer's first, second, or third session with the participant on the current date; the current date (number of month and day); and the initial

starting time (using the 24 hour clock). An example is ABD10720 with AB being the participant, D the observer, 1 signifying the first observation of AB for the date, which is 07/20. Subsequent entries in the line of the computer file and on each line are the codes for the behaviour variables.

Each subsequent line has a) *running time*, minutes plus seconds, entered by the computer from its internal clock; b) *location code*: location of the participant (mutually exclusive and exhaustive nursing home location codes are provided separately); c) *activities* of the participant (several hierarchically ordered categories are possible, *nil*, *unusual*, *social*, *active*, and *inactive* behaviours); d) *verbal communication levels*; e) *awareness levels*.

III. The Behavioural Dimensions

Activities of the Participant

Nil--unobservable or not in the home

00 could not find, should be in home.

01 left home--enter purpose as a *comment*.

02 unable to observe--enter reasons as a *comment*.[22]

09 other--to be specified via a *comment*.

Unusual

These are very atypical, generally unacceptable, or asocial, maladaptive behaviours. They include asocial, abnormal, repetitive or delusional behaviours and are not to be used for normal acts (code 11 is left open).

12 stereotyped body-movements--an assortment of behaviours of a stereotypic or nervous nature (not generated in response to external stimuli) and behaviours, not involving object use, that are

unusual because of the participant's persistence in them beyond their normal functional value (i.e., behaviours that have no functional value and become unusual by persisting for 10 sec such as persistent sweeping of non-existent crumbs, but not scratching of normal durations). These include true stereotypic movement of body parts which persist for 10 sec. Stereotypic movements are invariant action sequences (three or more) with no apparent adaptive significance other than their relation to getting attention or indicating something about the participant's mood, etc. (McGrew, cited in Hutt & Hutt, 1970). Examples include: rocking the trunk at the hips rhythmically back and forth or from side to side; minor stereotypies such as repetitively twisting hair in a stereotyped manner, hand-wringing, finger-flexion, hand-groping (as though reaching for an object), nail-biting, finger-chewing, and rubbing the table with fingertips, or brushing a portion of clothing with the hand; and Parkinsonian-like[23] hand tremors with an unclenched hand that appear to be small strokes made against an object. This code *does not include* visual examination of the feet or hands.

Comment if there are any tremors that would seriously interfere with object manipulation, walking, etc.).

13 repeated behaviour or question--forgetting is implied. This is a *none* stereotypic repetition of a behaviour or a *none* echolalic repetition of an utterance. The second instance and subsequent instances are scored with this code. Used, for example, when a question is repeated in circumstances that indicate the participant has forgotten asking the question before, such as when the participant asks to use the phone several times during the

observation period (the quality of the verbalization is scored under *verbal levels*). The repeated behaviours need not follow each other directly. For example, stirring a cup of coffee repeatedly with substantial pauses between sessions of stirring.[24]

Comment if the request relates to wayfinding (e.g., the participant asks where his/her room, or cane, or purse is, several times during the observation period).

14 delusional/hallucinating--in delusional behaviour the participant is acting on a false belief, that is, a misperception, such as treating a chair as a person. Hallucinatory behaviour has the character of a response to a sense perception but the relevant sensory stimulus is absent. Examples of behaviours included under this code are carrying on a conversation with a non-existent person; using a cane and a sweater like a flag and parading with it; urinating in a washbasin, garbage tin, or corner of a room; picking imaginary things off a garment; scrubbing a non-existent spot on clothing (when the spot has been verified not to exist); stepping over dark floor tiles as though over a hole; chasing after an imaginary person; directing instructions toward a chair; attempting to eat a playing card. Do *not* include sweeping non-existent crumbs because that falls within definition of code 12.

15 inappropriate object use/manipulation--using an object for a purpose that is outside the range of its normal or appropriate uses *or* the non-functional manipulation of an object for a minimum duration of 10 sec. The observer is to assume appropriate use, until the duration of the object's utilization suggests there is no functional purpose being served or that perseveration is occurring.

Examples of behaviours included under this code are manipulating a door handle like a pump handle; moving a chair repeatedly when the moves have no functional purpose; rearranging chairs in unusual positions such as lining many chairs up on one side of a table, or rearranging chairs even though the positioning is adequate; using a chair like a walker when the participant has no need for such support either because her/his walking capabilities are within the normal range or because an appropriate device is available; rolling stockings on and off or putting shoes on and off; using a spoon to sweep crumbs from the table to the floor.[25]

16 gathering--picking up and/or retaining an object. The eventual short-term or long-term result is that the object becomes part of a collection that is held or carried away.[26] Gather does not have the repetitive qualities of stereotypic behaviour or any delusional qualities. Examples are: collecting small objects and storing them in a pocket, or in some location such as a planter; or collecting towels to carry, or to store in some location.

A *comment* to specify what is gathered is helpful but not mandatory.

17 mimicking or echolalic behaviour--a form of repetitive behaviour in which the participant models the behaviour of another in a way that gestures or facial expressions are analogous to a mirror image or words and sounds are repeated in response to an external stimuli rather than being self-generated (not simple repetition such as that used when a particular word in an utterance is questioned by repeating it). Examples are: the participant, having heard "who's that", says "who's that" (usually several times) or having heard

"wait" in a conversation, says "wait" several times with other words; the participant mimics the sneeze of another.[27]

18 receives help with wayfinding--guidance is provided either to redirect the participant from entering an inappropriate area or to help locate some specific area in the environment.[28]

18+ verbal assistance (only) is given with wayfinding--For example the participant is verbally directed by a relative or caregiver to a location such as the dinner table or his/her room or is given the number of his/her room.

18- physical assistance (only) is given with wayfinding--For example the participant is guided by relative or caregiver to a location such as the dinner table or his/her room.

18± both verbal and physical help are given with wayfinding.

20 receives help with finding an object--guidance is provided to locate some specific item.

20+ verbal assistance (only) is given to find an object. For example, the participant is verbally directed by a relative or caregiver to locate an item such as purse, hearing aid, or eye glasses.

20- physical assistance (only) is given to find an object. For example, the participant is guided by a relative or caregiver to locate an item such as purse, hearing aid, or eye glasses.

20± both verbal and physical help is given to find an object.

29 other abnormal/unusual--specify what the behaviour is in a *comment* (e.g. for idiosyncratic behaviours that are abnormal but specific to the person, such as, head banging or habitual spitting on the floor).

Social Interactions

31 appropriate initiation of a social interaction or an attempt to initiate social contact with another (or others) in an appropriate manner. This code is used when the approach is appropriate even though the verbalization may be inappropriate or garbled. Social initiation is not limited to verbal behaviours. It also includes gestural initiations, such as an appropriate wave to a newcomer.[29]

32 appropriate, continuing social interaction--the exchange is an appropriate part of an ongoing interaction between one or more persons. Social interaction is not limited to focused verbal behaviour but also includes active listening (Sykes, 1977).

32+ positive, appropriate responses to another's social act or conversation. Examples of positive responses are: a) *approval*--endorsing or bestowing specific benefits (e.g., appropriately participating in tea party or birthday party; waving back to someone, or smiling and nodding to someone's comment; b) *teasing and joking*--an interaction (initiated by the participant) that has a humorous vein, thus a playful gesture that is accompanied by a grin (Van Hooff, 1972; e.g., a mock threat, such as throwing a wad of paper at another or mock aggression, such as pinching the cheek of another).

32- negative responses to another's social act or conversation, that is, antisocial, but not inappropriate. Examples of negative responses are: a) *disapproving*--a clear indication that the actions of another are not acceptable or liked (e.g., reprimands or scolding); b) *withdrawal*--obvious asocial movements or gestures that remove the participant from and undesired situation or person(s) (e.g., the participant turns her/his body away from someone); c) *aggressing*--behaviour directed toward the goal of harming or injuring another person or behaviour directed toward the goal of obtaining some object or benefit, thus includes defending a territory, oneself, or another person (include aggressive resistance to appropriate offers of assistance).

33 inappropriate social behaviour--an ill-suited, incongruous, or unseemly response when a higher levels of behaviour is required. The overture to another person is either one not customarily occurring between persons of the social status and age of the participant and interactor, or a minimal response is given to a social overture of another such as *no* social response or merely an orienting response (the latter is a stereotypic reaction to a novel stimulus, in this case a novel social stimulus). Examples include greetings that consist only of finger-waves[30] and peering through a circle made by the thumb and first finger (a sign that the participants is aware and reactive to the observer, cf. *awareness levels*, code 2+). This behaviour code includes actions that are normally considered socially inappropriate in the presence of another person (e.g., masturbating or nose-picking[31]).

33+ positive inappropriate responses to another's social act or conversation (e.g., participant approaches and kisses another person who is not considered a *significance other*).

33- negative inappropriate, that is, antisocial responses to another's social act or conversation (e.g., contribution to the table conversation consists of moans or yells, pounding on the table when it has no functional purpose, or pounding on another resident's door). Included in this activity code are inappropriate social initiations, such as an initiation to another's back or a social initiation such as a slap to the buttocks.

39 other social interaction--to be specified via a *comment* (e.g., a participant make sexual overtures to another).

Active Behaviours

These are *appropriate* behaviours or the *appropriate* use of objects; inappropriate acts are scored under *unusual* behaviours.

41 focused symbolic behaviour--employing skills directly related to manipulating, understanding, or producing symbols (i.e. writing, reading, mathematics or other numerical skills, reading music, and reading or making maps). Observers should be conservative and not assume that thumbing through a magazine is reading unless there is some evidence of comprehension. Examples include: reading a poster or a newspaper, playing cards, tracing a route on a map, adding numbers, doing a jigsaw puzzle, copying printed words into written words.

42 focused self-generated activity--these are recreational behaviours and are not concerned with self-care and are not under the direction of another person. Recreation is an activity that involves an unambiguous direction of attention and a structure or sequence of behaviours or some *self-initiated* motor skills. Examples include: playing horseshoes, colouring in a colouring book. Observers should be conservative and not score TV-watching with this code unless the participant has chosen the activity and is actively engaged in watching, which is measured by the extent of the attention given to

the TV and the exclusion of unrelated other activities, comments with regard to the program, giving less attention to commercials, etc.

43 externally structured activity--participation in actions that are primarily directed by another or for which guidelines are specifically provided by another, which may include the utilization of objects without cuing. Examples are: a handicraft session, baking class, exercise class, church service, sing-song, movie, or reality training involving such things as recognizing sounds on a tape recording.

44 object use--appropriate use of some specific object that signifies that the participant has knowledge of the proper use (e.g., using a food grater correctly in a cooking class when it is not cued by a another person). This behaviour code *does not include* the appropriate use of chairs, eating utensils, etc. This code will not be used very frequently. *Appropriate use of everyday items is normally ignored* (e.g., the use of chairs to sit, the use of utensils to eat) unless appropriate use alternates with inappropriate use, for example, if a fork is used to stir coffee, then to cut cake, then to stir coffee again, the observer could use codes 44-,44,44-.[32]

44- object use with an unexpected quality--if there is something untoward about the use of the object, but the action does not qualify as an *unusual* behaviour, the observer should append the negative sign to the code. Examples include stirring coffee with a fork (unless no spoon was provided) or picking up someone else's glass and drinking from it.[33]

45 cued object use--the participant uses a tool after a caregiver initiates the behaviour. Examples include: a caregiver

placing a pencil in the participant's hand and providing paper that results in the participant subsequently scribbling, rather than writing; a participant, in a cooking group, mashing bananas after being shown how.

46 self-care behaviours--initiation and performance of an appropriate caretaking behaviour. These include: a) *attending to body functions*, such as lavatory use; b) *dressing*--putting on or taking off clothing and other related objects, such as jewelry, glasses, and shoes; c) *grooming*--attending to the physical appearance of one's body or clothing; and d) *eating*--ingesting or preparing to ingest food and/or beverages (note: chewing or swallowing while engaged primarily in another activity is *not* scored as eating, i.e., chewing gum while reading a paper is scored as focused symbolic behaviour rather than eating).

47 cued care behaviour--the participant *continues* a care behaviour on his/her own, performing it appropriately, after being initiated into the behaviour though another person guiding the behaviour or modelling the behaviour (see list of self-care behaviours under code 46). Examples include: using a spoon after a caregiver initiates movement by either giving the participant a few spoonfuls or guiding the hand movement for the participant; following a caregiver when requested to proceed to a bathroom.

48 walking-searching/scanning--head and eye behaviour indicate visual searching of the environment, that is there is side-to-side movement of the eyes and/or the head, as if looking for a person or looking for a place *while* moving forward, propelled largely by the

legs *and* not in contact with any other person. If 48+ or 48- is not scored then a normal eye-ahead, chin-up head tilt is assumed.

48+ walking-searching/scanning as in code 48 behaviour with the head tilted upward--this is seen when gaze is directed above normal eye level.

48- walking-searching/scanning as in code 48 behaviour with the head tilted downward--head and eyes appear downcast and behaviour indicates little attention is given to the environment.

51 walking--movement forward, propelled largely by the legs *and* not in contact with any other person. The motion falls within the range of movements generally seen in normal walking. If + or - is not scored then a normal eye-ahead, chin-up head tilt is assumed.

51+ walking as in code 51 behaviour with head tilted upward--this is seen when gaze is directed above eye level.

51- walking as in code 51 behaviour with head tilted downward--head and eyes are downcast and behaviour indicates little attention is given to the environment.

52 group walking--participant is walking in contact with one or more participants or residents. *Comment* to indicate who is leading the group walk, the number of people, and the codes for others who are participating.

53 general movement--any other movement through space *not* clearly scored as another specific activity; typically, a transition between two behavioural states such as sitting and locomotion or movement that cannot readily be identified as part of an action. Examples are: attempts to depart as slowly rising from a chair; inching slowly around a table.

54 compliant walking--walking while in contact with, or being led by, a caregiver, usually being taken to an activity or another location. Do *not* use this code when the purpose of the walk is known to be toileting the participant; instead score the behaviour as code 47. Do *not* use this code when the purpose of the walk is known to be *finding a location* for the participant or *redirecting the participant from a prohibited area*,[34] score the behaviour as code 18 not code 54. The purpose may be known from the verbalization of the caregiver.

55 total care--a caregiving behaviour is performed for the participant by another person, with the caregiver performing a substantial part or all of the act, that is, the participant neither initiates nor assumes control of the act in order to execute it in an appropriate manner. Care behaviours are listed under code 46. Examples are: the participant being fed by another; the participant being given a pill by it being placed, with instructions, in his/her mouth, followed by a drinking glass being held to the participant's mouth; being bathed by a caregiver; the participant is being substantially supported by a caregiver while walking; the participant is being moved via wheelchair; the participant is being restrained by a caregiver (i.e. a tray is affixed to a geriatric chair--at which point a *comment* should note that a restraint has been applied).

56 self-movement in a wheelchair--the participant is sitting in the wheelchair and using it as a means of locomotion. If the participant is being propelled in a wheelchair then code 55 is used.[35]

59 other active behaviour--specified via a *comment* (e.g., characteristic gait. A *characteristic gait* observed in Alzheimer's

patients has steps that are so small that the toe of the foot appears only to move forward approximately three-quarters the length of the other foot; the heel is raised higher off the floor than in a normal walk, as if the Achilles tendon were shortened; and knees are bent and do not appear to straighten as leg moves forward, cf. the diagram of a patient with paralysis agitans, Murray, 1967, cited in Hutt & Hutt, 1970, p. 123).

Inactive Behaviours

61 standing-searching/scanning--head and eye behaviour indicate visual searching of the environment with a side-to-side movement of the eyes and/or the head, as in looking for a person or looking for a place *and* the participant is upright, on his/her feet, the eyes are open, but there is no specific observable activity (thus *not* acting as a listener in an ongoing social interaction). If + or - is not scored then it is assumed that the eyes are gazing ahead and the head tilt is normal.

61+ standing-searching/scanning as in code 61 behaviour with the head tilted upward.

61- standing-searching/scanning as in code 61 behaviour with the head tilted downward.

62 standing, inactive--the participant is upright, on his/her feet, the eyes are open, *and* there is no visual searching of the environment but there is no specific observable activity (thus *not* acting as a listener in an ongoing social interaction).

63 sitting, inactive--sitting, eyes open, but no specific observable activity (participant should be asleep or dozing for more than 5 sec for the code to be changed to code 64). Examples are:

waking up from sleep; sitting and intermittently making sounds; sitting in front of a TV when there is evidence that little attention is being given to the program (i.e., eye movement strays from the TV and/or there is no change in attentiveness when commercials appear).

64 asleep or dozing--either the participant is engaged in sleeping or sitting-inactive is alternating with dozing (the participant should be awake and sitting-inactive for more than 5 sec for the code to be changed to code 63). The other dimensions, verbal and awareness levels, are coded as *none* while participant is asleep. *Sleep* is signified by the body being in a relaxed position and the eyes being closed, but concomitant behavioural signs of sleep may be observed, such as decreased body movements, more regular breathing, and diminished response to environmental events. *Dozing* appears like sleep, but sleep is not confirmed, however, a transition to sleep may be distinguished through a change to deeper breathing and/or further relaxation of the body, such as a marked slumping of the body, arm or head.

69 other inactive behaviour--to be specified via a *comment*. An example is the participant lying on a bed, awake.

Verbal Communication Levels

The codes are arranged hierarchically, thus smaller numbers codes are given preference when a behaviour represented by a larger number code occurs in conjunction with a behaviour represented by a smaller number code. If a 5 sec pause occurs in any of the participant's verbal communications, the subsequent utterance is scored as another utterance.

Volume

Volume is scored by appending -, + or ! to the verbal code. If +,-, or ! is not scored then normal volume is assumed. The codes are:

- (minus) a whisper or speaking in a low, soft voice that is distinct.

+ (plus) loud, that is the volume is excessive for the background noise level and for the hearing ability of the listener.

! (exclamation) a yell, speaking loudly and emphatically without the high-pitched urgency of a scream.

Verbal Levels

0 none--the participant is silent.

1 inappropriate verbalizations--utterances that are analogous to sentences but are nonsequiturs, or word strings that are not relevant to the context or situation. Their content is not especially garbled such as it is in discontinuous utterances (verbal code 2). Such verbalizations may be conversations with a nonexistent person or with persons too distant to include in normal conversations. These verbalizations should be entirely heard. Examples are: replies to conversations between others across the room or on a TV; or talking at normal volume to oneself.

2 discontinuous verbalizations--utterances composed of *short word strings* that are *not* logically sequential such as unrelated phrases. These verbalizations should be entirely heard. An example is: "and then we would do that...Joe Joe...I'm not foolish you know...so how do they know."[36]

3 informative verbalizations--statement(s) of fact(s) or providing specific information. This type of verbalization includes: giving directions or orders, providing answers, and also asking simple and appropriate questions that are not primarily for social conversation. An *answer* is a response to a specific question that provides some information in an appropriate length of time, even if the utterance is as brief as "I can't". An *order* is the use of a word or words to direct or command another person or one's self toward a certain thing or activity, but the utterance may express a desire, such as "Go away". A *question* is a query about something, such as "Where is my room?" or "Why?".

4 conversational verbalization--a social interchange primarily for the purpose of being amiable. Although the utterance may be phrased as an answer, a directive, a question or the provision of information, that is not the main purpose. The verbalization should be composed of words that are relevant to the context or situation. Examples: "How are you today?", which is frequently followed by the relation of some incident such as whether the participant slept well or the participant relating some personal story.[37]

5 not understood--a verbalization that is *partly heard* and therefore cannot be judged to fall entirely within any of the foregoing categories. This included verbal communication resembling words but not recognized as words because the utterances are in some *other language*, not understood by observer.

9 other verbal communication--to be specified via a *comment* (e.g., singing, vocal emotional outbursts, echolalic utterances, or utterances that are word-like sounds such as glossolalia or

✓

persistent stuttering). These verbalizations should be entirely heard.[38]

Awareness Levels.

These codes that record the participant's awareness of the environment have no hierarchical arrangement. The observers should not use any level other than *aware* unless the participant demonstrates there is a reason the use the other code.

0 unaware of the environment--the participant is neither engaged in a normal interaction with the environment nor does the participant orient to other people or activities in the immediate surroundings. That is, there is no demonstration of an awareness of any particular item or of occurrences in the environment. If the participant's actions are scored as delusional behaviours, then the participant could be assumed to be unaware of the normal environment.

1 none-selective attention--the participant demonstrates an *inability to selectively attend* to activities or sounds that are pertinent to him/her, by reacting inappropriately to distant events. Examples are: inappropriately joining a conversation in another room; answering a question that occurs in a conversation that specifically excludes the participant, such as one between two ward-aides; answering voices on the radio or TV.[39]

2 observing the observer--the participant is actively watching the observer and is suspected of being reactive to observation. Glances at the observer may be guarded or momentary and still show an awareness (especially in cognitively competent persons). If the participant appears to perceive the observer in a manner indicating

the observer is merely another person in the environment (like a caregiver), this level of awareness is *not* assumed.

2+ observing the observer *and* the observer has clear evidence that the participant is aware of being the target of observation. For example, peering through a circle made by the thumb and first finger is taken as a sign that the participant is aware and reactive to the observer (cf. *activities* dimension, code 33). Once the participant has evidenced awareness at this level then lower levels of awareness must not be assumed without some demonstration that awareness has altered.

3 aware of the environment--the participant orients to sounds and activities in his/her surroundings and generally responds to people (including the observer). This is the default code for awareness and it is used unless one of the above levels are demonstrated. This level of awareness is scored even if the participant is only interacting with a small part of the environment. Examples are: a participant smiling at a neighbor, examining a shoe, reading, or being engaged in some other self-generated activity.

9 other awareness behaviours--noted via a *comment*.

Comments

Besides being used with the behaviour codes that call for a comment, a comment should always be entered when the observer is uncertain whether the code is used appropriately or when there are relevant details that would help interpret the behaviour. It is helpful to note the dimension/code to which the comment applies (e.g., *location*, *activities*, *verbal*, or *awareness levels*).

At the end of the observation session the observer should reread the comments and fill in any details that are necessary for the comment to communication information to someone else.

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[20] These definitions are for the behaviours in the coding schemes in Appendix C and I. The definitions were developed while the author was supported by a grant from National Sciences and Engineering Research Council of Canada. They are part of an ethogram for the behaviour of demented adults being prepared by the author. Some of the definitions are based on those for a coding scheme used for retarded adults by Landesman-Dwyer et al. (1976). The wording of the definitions presented here should be considered preliminary. Subsequently modifications were made in light of the results of the dissertation (see other footnotes) and other analyses (cf. Martin & Bateson, 1987 regarding defining behavioural categories).

[21] The type of restraint should be recorded. It is important to distinguish between geriatric lounge chairs, from which some participants may be able to remove the trays, and geriatric wheelchairs on which the trays have a locking mechanism.

[22] Code 02 for *unobservable* behaviour would be better split into three codes: 1) behind closed doors for care behaviours (cf. code 46) provided by a caregiver; 2) behind closed doors for visiting, that is, at the visitor's choice; and 3) behind closed doors for privacy, that is, at the participant's choice. For other times when the participant is unobservable code 09 would be used. Redefinition would allow these components of participants' time schedules to be included (see Appendix G).

[23] True Parkisonian tremors are ignored.

[24] Observers did not use code 13 reliably; it should be omitted.

[25] Code 15 behaviours are *fiddling* manipulations of objects that are not stereotypic in nature.

[26] Code 16 should not be used for walking with a gathered object, instead use the code for walking, with a *comment* to advise that a gathered object is being held.

[27] Code 17 behaviour could be included in the verbal communications dimension and omitted from the activities dimension.

[28] Observers found this code 18 confusable with code 54. Code 18 should be reserved for instances when the participant gives signs of having *navigational difficulty*, that is giving evidence of being lost or of enter an inappropriate area. Code 18 should not be used for instances when the caregiver is merely escorting the participant from an another wing back to the special wing. The definition for code 18 should have included instances when wayfinding help was needed but was not given, that is, when *navigational difficulty* was evidenced.

[29] Unless the researcher has a special interest in whether the participants initiate conversationrs or not, code 31 would be better combined with code 32.

[30] Hand-waves, even at close quarters, should be considered appropriate, given the poor verbal skills of the Alzheimer's patients.

[31] Nose-picking should be ignored, instead of being included as an inappropriate social behaviour, because it occurs so often with some individuals.

[32] Code 44 behaviour would be better omitted because it tempts

observers to use it for the appropriate use of everyday items.

[33] The behaviours recorded via code 44- suggested *inappropriate social* conduct rather than *unusual* activities. It was a useful code.

[34] Observers found code 54 confusable with code 18.

[35] Code 56 behaviour never occurred with SDAT participants.

[36] Observers could not reliably distinguish verbal code 1 from verbal code 2, therefore, these codes were not analyzed separately.

[37] Observers could not reliably distinguish verbal code 3 from verbal code 4, therefore, these codes were not analyzed separately.

[38] Verbal code 5 and verbal code 9 were analyzed together as *other verbal communication*. It would have been better to reserve verbal code 5 for foreign language use. However, a better solution would be to have more verbal codes such as a separate code for active listening, another code for singing and emotional outbursts, another code for instances when the utterance was not heard by the observers, and verbal code 9 should be reserved for instances that truly fall into no other category. Unusual utterances such as echolalia, glossolalia, and persistent stuttering would be better included in a category termed *inappropriate verbal communication* that combined verbal codes 1 and 2.

[39] Awareness code 1 was seen so rarely that it could not be determined that observers used the code reliably.

APPENDIX E

RECODING FOCAL OBSERVATION DATA

The recoding of the activity dimension was done in Study 1 mainly for two reasons. Firstly, restless locomotion (as defined in Appendix A), could not have been obtained without recoding because coders could not distinguish aimless wandering from ordinary walking until the subject had made repeated trips, or it was revealed that the trip had no particular purpose or destination. Coders would have had sufficient information at the end of a participant's trip or the end of their observational session to revise their data immediately after it was collected but, as discussed in Study 1, coders did not have the skills to access the computer tapes and edit the data during collection procedures. As well, the definitions of wandering behaviours were not finalized until after the data were collected because they were not required for the coding scheme. Secondly, Sackett (1979) advises that recoding is essential for data collected with hierarchical schemes, such as the one used for this study (Appendix C), if true duration and frequency measures are desired and ~~if lag sequential analyses are used~~. A coding system that imposes priorities as to whether or not specific behaviours are to be recorded when several occur concurrently produces frequencies for low priority behaviours that are different than they would be if placed higher in the hierarchy or if they were coded in the absence of a coding scheme (Jones, 1973). The hierarchical scheme used for this study (Appendix C) gave precedence to unusual and social activities rather than behaviours related to locomotion and it was necessary to prioritize the latter because of the central interest in wandering behaviours.

The next question that arises is can this recoding be done *post hoc*. Bakeman and Gottman say, "if the times of onsets and offsets for the base behaviours were recorded, data consisting of ME&E categories could always be generated later, if such data were required for subsequent analyses" (1986, p. 34, ME&E is their abbreviation for mutually exclusive and exhaustive). That is, they suggest that a coding scheme consisting of two nonmutually exclusive behaviours (e.g., looking at a person and talking to a person) could be converted *post hoc* to a mutually exclusive and exhaustive coding scheme with four codes (*a*. looks, *b*. talks, *c*. both looks and talks, and *d*. neither looks nor talks; cf. Sackett, 1987). In the present coding scheme, the redundant recoding for locomotion provides offset and onset times for those activities (offset and onset times are available through a comparison of the changes in location, recorded on the location dimension, and the locomotion activities independently recorded in the activities dimension).

An additional type of recoding was desired, however, because some of the wandering behaviours required different conceptual units of behaviour than the original coding scheme provided. Bakeman and Dabbs (1976) have suggested, however, that observational data can be recoded into different conceptual units *post hoc*: "Occasionally it becomes useful to recode data into different conceptual units, segment a data stream into different length intervals, or even transform from one data type to another" (e.g., time based concurrent data to time based sequential data, 1976, p. 338). On one level, recoding *post hoc* presents some of the same kind of decision making problems that are encountered in designing a coding scheme and in defining those codes in a way that makes them mutually exclusive. On another level, the recoder is forced to make some of the same kind of decisions that the original observer encountered. For example, the recoder must decide whether a particular locomotion was purposive or not, but in recoding sequential data, the recoder is in an enviable position for such decisions when compared to the original observer, because the recoder knows what went before and what will come after all behaviours (except the first and last in each observation). Recoding *post hoc* avoids the experimenter bias that may result when observers are told to look for certain types of unusual behaviours (Hollenbeck, 1978) but introduces the possibility of experimenter bias at the level of recoding. One way of checking whether the latter bias is a factor in recoding is to have the recoder perform the recoding task on a random sample of data and calculate the intraobserver reliability. This was done for Study 1 of the dissertation.

Transforming Activity Codes to Activity-2 Codes

The original coding scheme had a hierarchical structure that gave priority to unusual behaviours. The codes for locomotion were placed after the social and focal behaviours (Appendix C). However, the scheme provided redundant coding of locomotion. Not only were there codes for various forms or styles of locomotion, locomotion was also recorded via changes in location. In the original coding scheme the conceptual units for location were comparatively small, for example, there were six location codes for the lounge of the special unit and three codes for the hallway in the unit, making locomotion relatively easy to visualize through the location codes. The redundant coding provided offset and onset times of locomotion through a comparison of the changes in location, recorded on the location dimension, and the locomotion activities independently recorded in the activities dimension. For example, when particular locations were repeated many times during a brief span of time, that indicated that participants were repeatedly traversing the same areas, thus, the movement could be recoded as restless locomotion (cf. Appendix A).

The data, as originally coded, had five relatively independent dimensions: time-of-day, location, activity, types of verbal expression, and types of awareness (Appendix C). The latter four dimensions were time based, that is, the duration the participant spent in each location, at each activity, in each utterance, and at each level of awareness was a component of the data, which was useful in recoding the activity dimension.

The following explanation and chart illustrate the data and the recoding process. The chart contains all codes in the activity dimension (Activity) of the original coding scheme and all codes in the activity dimension (Activity-2) of the recoding scheme.

The activity codes in each line of the raw data file were evaluated for their relevance to the definitions of the wandering behaviours (see Appendix A). That is, each activity code was considered in the context of the preceding and subsequent activity codes and the codes that simultaneously occurred in the time, location, verbal, and awareness dimensions. Activity-2 codes denote the results of the evaluation. Thus, the wandering behaviours in the Activity-2 recoding scheme result from recoding data into different conceptual units. Various other codes were grouped into more molar categories because of the focus on wandering behaviours. For example, several types of unusual behaviours were combined to become *unusual* in the Activity-2 recoding scheme. Where there was conflict between the two types of recoding, the transformations of original codes into wandering behaviour was given precedence over the regrouping of Activity codes. For example, as evidenced in the chart that follows, a code of 17, designating mimicry, would normally become an Activity-2 value of 19, but if the line carried the information "NOTE '76'", then the annotation overrode normal transformation. "OLD '#'" typically was appended to a line to track the logic of the recoding.

Activity Codes were originally two digits only. A third digit was appended to new codes 70-79 to indicate that another behaviour occurred concurrently with a wandering behaviour. Thus, 7?5 indicates that 54 (cf. Appendix C) was the concurrent activity, that is, a staff member was guiding the subject (perhaps, returning her or him from absconding) and 7?9 is reserved for a delusional or other unusual or abnormal behaviour that is concurrent with a wandering behaviour). See the table for other values of third digits.

Equivalent Codes

Original Activity Code	*Activity-2 Code*
NIL BEHAVIOURS	
00 not found	-00 not found
01 left nursing home	-01 left nursing home
02 unobservable	-09 other unobservable
09 other	-09 other unobservable

UNUSUAL BEHAVIOURS

12	stereotypic	-76	fiddling
13	repeated behaviours	-19	other unusual behaviours
15	inappropriate use of object	-19	other unusual behaviours
16	gathering	-76	fiddling
17	mimicry/echolalic utterances	-19	other unusual behaviours
18	wayfinding help	-74	navigational difficulties
20	help finding an object	-77	searching
29	other unusual behaviours	-19	other unusual behaviours

SOCIAL BEHAVIOURS

31	initiate social interaction	-32	social interaction
32	social interaction	-32	social interaction
33	inappropriate social interaction	-33	inappropriate social interaction
39	other social interaction	-33	inappropriate social interaction

APPROPRIATE ACTIVE BEHAVIOURS

41	symbolic	-81	high focal activity
42	self-generated	-81	high focal activity
43	external	-81	high focal activity
44	object use	-82	low focal activity
44-	unexpected quality/object use	-82	low focal activity
45	cued object use	-82	low focal activity
46	selfcare	-82	low focal activity
47	cued care	-82	low focal activity
52	group walking	-79	group walking
55	total care	-55	total care

INACTIVE BEHAVIOURS			
61	stand-search	-62	stand
62	stand	-62	stand
63	sit	-63	inactive
64	dozy	-64	dozy
69	other inactive behaviour	-63	inactive

Transformations

Original Activity Code:		*Activity-2 Code:*	
NIL BEHAVIOURS			
02	cannot observe:		
	if visiting	32	indicated by NOTE
	if left in toilet	46	indicated by NOTE
	if being toileted	55	indicated by NOTE
UNUSUAL BEHAVIOURS			
13	repeated behaviour:		
	if wayfinding problems	74	indicated by NOTE
	if restless handling of object	76	indicated by NOTE
14	delusional:		
	if restless (act/verb-/14/0)	76	indicated by NOTE
	if unusual (act/verb-/14/*)	19	indicated by NOTE
15	inappropriate use of object:		
	if restless small movements	76	indicated by NOTE
29	other unusual behaviours	74-79	indicated by NOTE
APPROPRIATE ACTIVE BEHAVIOURS			
48	walk-search/scan		
	if purposive	70	indicated by NOTE
	if during restless locomotion	74	indicated by NOTE

	if searching	77	indicated by NOTE
51	walking		
	if purposive	70	indicated by NOTE
	if absconded from room/activity	71	indicated by NOTE
	if absconded from floor	72	indicated by NOTE
	if absconded from facility	73	indicated by NOTE
	if restless locomotion	75	indicated by NOTE
	if searching	77	indicated by NOTE
	if trespassing	78	indicated by NOTE
53	general movement:		
	if preparatory to locomotion	75-79	indicated by NOTE
	if preparatory to sitting	63	indicated by NOTE
	if not locomotion, and not searching	76	indicated by NOTE
	if searching	77	indicated by NOTE
54	compliant walk:		
	if absconded from room/activity	71	indicated by NOTE
	if absconded from floor	72	indicated by NOTE
	if absconded from facility	73	indicated by NOTE
	if escorted due to navigational difficulty	74	indicated by NOTE
	if returned from trespassing	78	indicated by NOTE
	if escorting to toilet from adjacent room	55	indicated by NOTE
59	other activity:		
	if purposive	70	indicated by NOTE
	if characteristic gait	75	indicated by NOTE

if other (new) wandering behaviour 71-73, 77-79 indicated by NOTE

INACTIVE BEHAVIOURS

61 stand-search: 74 indicated by NOTE

if navigational difficulty (at choicepoints/during locomotion)

(looks out window-/74)

Wandering Codes for Concurrent Behaviours

Wandering behaviour and 31 - 7?1

" " " 32 - 7?2

" " " 33 - 7?3

" " " 41, 42, 43 - 7?4

" " " 54 - 7?5

" " " 61, 62 - 7?6

" " " searching - 7?7(77)

" " " 44, 45, 46 - 7?8, 47

" " " 14 or otherunusual/abnormal activity - 7?9

Other Codes for Concurrent Behaviours

31 as part of a walk ??2 appropriate social indicated by NOTE

32 as part of a walk ??2 appropriate social indicated by NOTE

(thus 702 is a purposive walk & appropriate social)

33 as part of a walk ??3 inappropriate social indicated by NOTE

39 as part of a walk ??(2/?) other social

	indicated by NOTE
41-47 with location changes	??4 behaviour & walk indicated by NOTE
61 stand-search:	
if brief & between purposive locomotion codes	706 indicated by NOTE
if brief & part of absconding	716-736 indicated by NOTE
if brief & part of trespassing	786 indicated by NOTE
if brief & part of group walk	796 indicated by NOTE
62 stand	
if brief & between	706 indicated by NOTE
if part of absconding	716-736 indicated by NOTE
if brief & between restless locomotion codes	756 indicated by NOTE
if trespassing	786 indicated by NOTE
if part of group walk	796 indicated by NOTE
63 sit (even if observers' comments says "fidgeting throughout"	63-/76, because 63 indicates just sitting without concurrent behaviour)
Activity code and location R01-R38,R50 or location T01-T38,T50 if appended NOTE does not record a legitimate reason for the participant's presence	-78 trespassing or -787 if trespassing & searching
Activity code & NOTE that activity began in	-78 trespassing or

location R01-R38,R50 or T01-T38,T50	-787 if trespassing & searching
Activity code & location R44-R49 or T44-T49 &/or a NOTE that activity began in location R44-R49/T44-T49 & participant-S (S was the only male)	-74 navigational difficulty or -747 if navigational difficulty & searching
Activity code & location R39-R43 or location T39-T43 &/or NOTE activity began in location R39-R43/T39-T43 & participant-any but S (S was the only male)	-74 navigational difficulty or -747 if navigational difficulty & searching

Note: In same sex D-wing bedrooms 70 or 745 might be used but in other sex bedrooms Code 74 is used, i.e. navigational difficulty is assumed (because of the special unit mores).

Note: Code 56 for self-movement in a wheelchair did not occur.

Sample Data File with Annotations

The initial line contains the computer file name, consisting of the participant code, the observers code, the month, the day and an extension (.DAT), plus the starting time. Each data line contains the following information:

TIME (8 columns with hour:min:sec) slash (/)

LOCATION CODE (2-3 columns) slash (/)

ACTIVITY CODE (2-4 columns) slash (/)

VERBAL CODE (1-2 columns) slash (/)

AWARENESS CODE (1-2 columns) slash (/)

COMMENT CODE (2-3 columns)slash (/) comma (,)

```
PIW10715.DAT,07/15/86,17:31:37,
17:31:39/D02/32+/5/3/   /, NOTE "site required sitting, talking to
                                     other"[40]
17:32:03/D02/33/5/3/   /, NOTE "sitting/talking to self"
17:32:12/D02/53/0/3/   /, NOTE "sitting, general movement"
17:32:21/D02/44/0/3/   /, NOTE "sitting, object use"
17:32:27/D02/33/5/3/   /, NOTE "sitting, talking to self"
17:32:44/D02/31/5/3/   /, NOTE "sitting, talking to other"
17:33:11/D02/32+/5/3/   /,
17:33:18/D02/33/5/3/   /,
17:33:23/D02/32+/5/3/   /,
17:34:08/D02/33/5/3/   /,
17:34:23/D02/44/0/3/   /, NOTE "sitting, object use"
17:34:35/D02/33/5/3/   /,
17:34:57/D02/63/0/3/   /, NOTE "sitting, only"
17:35:11/D02/33/3/3/   /,
17:35:18/D02/13/0/3/   /, NOTE "sitting, 2nd occurrence of an unusual
                                    behaviour"
17:35:28/D02/33/5/3/   /,
17:35:35/D02/31/5/3/   /,
17:35:42/D02/44/0/3/   /, NOTE "sitting, object use"
17:35:49/D02/33/5/3/   /,
17:35:56/D02/31/5/3/   /,
17:36:13/D02/44/0/3/   /, NOTE "sitting, object use"
17:36:24/D02/33/9/3/*1/,[41]
17:36:39/D02/33/5/3/   /,
17:37:09/D02/53/0/3/   /, NOTE "general movement, replaces 63 & 44"
17:37:14/D02/33/5/3/   /,
17:37:36/D02/62/0/3/   /, NOTE "stand, replaces 53"
17:37:40/D02/33/5/3/   /,
17:37:45/D02/31/3/2/   /,
17:37:53/D02/33/5/3/   /,
17:37:57/D02/51/0/3/   /, NOTE "walking, incompatible with 62"
17:38:08/D05/33/5/3/   /,
17:38:21/D06/33/5/3/   /,
17:38:28/D06/32+/5/3/   /,
17:39:22/D06/62/0/3/   /, NOTE "stand, incompatible with 51"
17:39:27/D06/32+/5/3/   /,
17:39:52/D06/32-/5/3/   /,
17:40:11/D06/32+/5/3/   /,
17:40:22/D06/62/0/3/   /, NOTE "stand, infer still standing"
17:40:25/D06/31/5/3/   /,
17:40:43/D06/51/0/3/   /,  NOTE "walking, incompatible with 62"
17:40:54/D44/31/5/3/   /,
17:41:02/D44/52/0/3/*2/, NOTE "group walking with P"
17:41:16/D46/31/5/3/   /, NOTE "group walking with P, talks to
                                   someone"
17:41:39/D48/52/0/3/   /, NOTE "group walking with P"
```

Brief Sample of Locomotion Data with Annotations

```
14:08:24/X44/51/0/3/   /, NOTE "WALKS AT NURSING STATION"
14:08:34/X88/51/0/3/   /, NOTE "WALKS AT CROSSROADS"
14:09:04/A77/51/0/3/   /, NOTE "WALKS IN A-WING HALL"
14:09:56/A77/48/0/3/   /, NOTE "WALK-SEARCH STARTS"
14:10:19/A01/48/0/3/   /, NOTE "SAME, IN A-WING LOUNGE"
14:10:31/A03/48/0/3/   /, NOTE "SAME, IN A-WING LOUNGE"
14:10:58/A03/62/0/3/*1/, NOTE "HAS STOPPED BRIEFLY SEES OTHER"
14:11:02/A03/51/0/3/   /, NOTE "MOVES ON"
```

[40] The notes in the computer file would continue on the line on which they were begun so that there were no blank lines of data.

[41] The computer program entered the *1 automatically when a code ending in 9 was used in order to prompt the coder to enter a reason for a 9/"other" code being used. On this occassion the coder did not write a comment.

APPENDIX F

CORRELATION[42] *OF THE OBSERVED FREQUENCIES OF WANDERING BEHAVIOURS*

	ABSR	ABSF	NAVD	RLOC	FIDD	SRCH	TRES	GRPW[43]
ABSR	-							
ABSF	.50	-						
NAVD	-.35	-.21	-					
RLOC	.27	.32	.19	-				
FIDD	.64	.29	-.06	.16	-			
SRCH	-.35	-.28	-.22	-.55	-.71	-		
TRES	.46	.98	-.17	.24	.24	-.27	-	
GRPW	.00	-.32	.32	.52	-.24	-.26	-.31	-

[42] The Pearson correlation coefficients are the from the frequencies of each of the wandering behaviours, obtained in Study 1, summed across all participants. The unit of analysis, therefore, is the individual rather than the behavioural event.

[43] Legend: ABSR, absconding from a room or activity; ABSF, absconding from the top floor to a lower one; NAVD; navigational difficulty; RLOC, restless locomotion; FIDD, Fiddling; SRCH, searching; TRES, trespassing; GRPW, group walking. Absconding from the nursing home was not observed.

APPENDIX G

COMPARING INSTANTANEOUS SCANS WITH FOCAL OBSERVATIONS THAT USED CONTINUOUS RECORDING

A comparison of the time budget for SDAT participants obtained from instantaneous scans in Study 4 and the time budget obtained from focal observations in Study 1 revealed several notable differences (cf. Table A in this appendix). These can be attributed chiefly to three things, differences in the samples, differences in the methodologies, and differences in the effectiveness with which the recoding strategies for the two types of data could recover information from the data, given both types were coded with a hierarchical coding scheme. This appendix will attempt to unravel the reasons for the various differences in the time budgets derived from the two methodologies, to evaluate, for future research on wandering, the utility of the instantaneous scan methodology, as well as the hierarchical coding scheme. The concern with respect to the hierarchical coding scheme centers around its differential reduction of the accuracy of the various behaviours in a manner that, roughly, has an inverse relationship to the behaviours' preeminence in the scheme. The recoding process appeared to have been relatively successful at reducing these hierarchical effects on locomotion in the focal data but not in the data from instantaneous scans.

Evaluation of the accuracy of instantaneous scans is considered important because scans are cost effective in comparison to focal observations. The latter typically use continuous recording procedures and require highly skilled coders. Instantaneous scans require less sophisticated technology and less training of coders, although the coders typically have high interobserver reliabilities.

Among other advantages, such as scans being less intrusive and therefore suitable for studying cognitively normal adults, scans are reported to provide accurate estimates of time budgets, frequencies and durations (Powell et al., 1975). However, the use of a hierarchical coding scheme in Study 4 appeared to reduce the accuracy of estimates based on instantaneous scans. Very little has been published about hierarchical schemes and nothing was found about their use with instantaneous scans.

The purported accuracy of instantaneous scans is based on their comparison, not with the type of data in Study 1, but with continuously collected data (Powell et al., 1975). Continuous collection, the golden mean against which all other observational methods are assessed, involves *continuous collection with a continuous recording procedure*. Both the scan methodology in Study 4 and the focal methodology in Study 1 *sampled* the participants' behaviour; the scans sampled behaviour for a point in time, whereas, the focal observations collected samples of data for 10 minute periods of time using a continuous recording procedure (Martin & Bateson, 1986; Sackett, 1978). Although the data were collected by the same coders observing the same SDAT participants during the same month, *the data samples are different*. This is one of the reasons that the time budgets could differ.

Time budgets derived from hierarchical coding schemes are *not true measures of total occurrence*; *they are accurate only for the categories that were prioritized by the hierarchical coding scheme*. Moreover, the bias introduced by a hierarchical coding scheme is not merely linear, that is, inversely proportional to the priority of the codes in the scheme. Jones (1973) has pointed out that when priorities are imposed as to whether or not specific behaviours are to be recorded when they occur simultaneously with others;

> this means that frequencies for low priority behaviours will be different from what they would be if placed higher in the hierarchy, or if they were coded separately (i.e., not as one of several other codes in the same observation system). Priority coding usually means that frequencies for low priority codes will tend to be lowered as the frequency of higher priority codes increases, particularly when the two classes of behaviour tend to occur nearly simultaneously....The magnitude of low priority behaviour scores will be dependent on the joint occurrence of low and high priority behaviours during the observation periods. (p. 138)

Thus, when a hierarchical coding scheme is used the measures produced, whether they are frequencies, durations, or measures derived from frequencies or durations, such as time budgets, are inaccurate and are not comparable to measures derived from studies that do not use exactly the same hierarchical system.

In a rare warning about hierarchical schemes, Sackett (1979; see Bakeman & Gottman, 1986) says recoding is essential if true duration and frequency measures are desired and if lag sequential analyses are to be used. The exemplar that follows is Sackett's (1979). In a hierarchical scheme coding rules define the importance or priority of each behaviour. For example, a hierarchical scheme might require that *touch* is always scored when it occurs, and *vocalize*, and *look*, are successively less important. Then *vocalize*, would be scored when it occurred alone or in combination with *look*, but not when coupled with *touch*. *Look* would be scored only when it occurred alone. "Thus, overall frequency or duration scores will not accurately measure the actual totals for *vocal* and *look*, behaviour, and lag probabilities will not yield a true picture of sequential dependencies" (1979, p. 631). This problem is readily cured, Sackett suggests, by defining the seven combinations of these three behaviours (T,V,L,TV,TL,VL,TVL) as independent categories.

Recoding would not seem to be necessary, however, if an adjustment was made to the definition of the behaviour codes in the hierarchical scheme used in Study 1 and Study 4. The scheme had the two essential qualities for lag sequential analysis (and other analyses). It was exhaustive because the "wastebasket" categories (codes ending in 9s) made it so. It was also mutually exclusive, because the behaviours were defined in a manner that made them so. The definitions of the behaviours, like *group walking*, that were not prioritized in the original coding scheme, however, should always have the codicil "given that none of the prioritized behaviours occur". Therefore, the full definition of group walking in the original hierarchical scheme was "participant is walking in contact with one or more participants or residents, given that none of behaviour coded under the *unusual* or *social* categories occur concurrently." Nevertheless, the data collected for Study 1 were recoded in the way specified by Sackett (cf. Appendix E). That is, when there was evidence that locomotion had occurred concurrently with other activities, new behaviour categories were established for these combined occurrences, as advised by Sackett (1979). Thus the extent of the bias introduced by prioritizing the behaviours in the *unusual* or *social* categories became evident. However, these combined occurrences accounted for a very small proportion of total time. Unusual behaviours were rarely combined with locomotion (only 1.12% of the total time in the study), very likely because several of the unusual behaviours were the basis of fiddling, one of the wandering behaviours, which was combined with locomotion. The other type of behaviour given priority to locomotion was social activity. It was found that the amount of time spend in locomotion combined with social activity was only 3.76% of the total time in the study. Because the wastebasket categories in coding schemes often account for larger percentages of time than this (Sackett, 1979), and because the addition of 27 new behavioural categories in the lag sequential analyses would make the analyses unwieldy, the combined occurrences were subsumed under the appropriate major category classifications. However, that means that frequencies and duration measures in Study 1 were not *true* measures of total occurrence. *Measures were accurate only for the categories that were prioritized by the hierarchical coding scheme.*

In the time budgets delineated in Table A the following behaviours were, considering the limitations of the recoding process, true measures: absconding (all levels), navigational difficulty, restless locomotion, fiddling, searching, trespassing, group walking, unusual, left home, and unobservable. The limitations of the recoding process were, of course, one of the reasons why a time budget derived from the scan data and a time budget derived from the focal data might differ and will be considered in detail.

Table A

ACTIVITY TIME BUDGET PERCENTAGES FOR INSTANTANEOUS SCANS AND CONTINUOUSLY RECORDED FOCAL DATA

	Focal	Scan	Difference
Absconding from room/activity	0.91	2.75	1.84*
Absconding from floor	0.18	0.10	-0.08
Absconding from nursing home	0.00	0.10	0.10
Navigational difficulty	2.41	0.88	-1.53
Restless locomotion	13.33	2.94	-10.39*
Fiddling	5.78	1.67	-4.11*
Searching	0.05	0.88	0.83*
Trespassing	0.15	0.20	0.05
Group walking	3.16	1.77	-1.39
Purposive walking	1.63	6.08	4.45*
Transitional movement	0.00	1.95	1.95
Inactive	46.38	47.84	1.46
Social	10.22	7.24	-2.98
Focal Activities	13.23	19.71	6.48*
Care Given	1.46	2.75	1.29
Unusual	0.48	0.49	0.01
Left home	0.00	1.77	1.77
Unobservable	0.63	0.88	0.25
TOTAL	100.00	100.00	0.00

Note: Significant differences have asterisks. A difference with a minus sign signifies the *scan* estimate was smaller than the *focal*.

According to the time budget derived from scan data approximately 11.28% of the SDAT participants' time was spent in wandering behaviours in contrast to the estimate from focal data of 25.97%. Much of the 14.71% difference between these two estimates of the total time spent in all wandering behaviours was accounted for by one category, *restless locomotion*. Focal observations yielded an estimate for restless locomotion that was 10.39% higher than the scan estimate (leaving 4.32% of unexplained). Marked differences were noted in the estimates for other behaviours. For example, the amount of time for *absconding from a room/activity* was three times more when one uses the scan estimate rather than the focal estimate, whereas the time spent in *navigational difficulty* was approximately one-third. When the amount of time these behaviours consume out of total time is considered, the behaviours may seem inconsequential. However, behaviours such as absconding were very important components of the SDAT participants' behavioural repertoire and some of the discrepancies for behaviours that account for only a small percentage of time prove to be statistically important as well.

The accuracy of the scan data was statistically tested against the focal data for goodness of fit with a chi-square analysis. The proportion of time spent in each behaviour according to the observed durations in the focal data was used to calculate *expected frequencies*. These were then compared with the *observed frequencies* from the scan data (i.e., the behaviour classifications were the unit of analysis). The overall chi-square was 486.19, *df* 14. *Absconding from the nursing home*, *transitional movement*, and *left home* were not included in the chi-square analysis because it was not possible to calculate expected values from the focal observations (they had zero frequencies). The scan frequencies that were significantly less than predicted from the durations in the focal data were those for *restless locomotion* and *fiddling* (X^2 82.59, 29.86, respectively, *df* 14). The scan frequencies that were significantly greater than expected were those for *absconding from the room/activity*, *searching*, *purposive walking*, and *focal activities* (X^2 37.75, 141.33, 123.83, and 32.33, respectively, *df* 14).

Comparisons of Unrecoded Data

The first step in attempting to unravel the reasons for these significant differences was an examination of the unrecoded data from both the instantaneous scans and the focal observations. "Time budgets" based on the original coding schemes for the scan and focal observations are presented in Table B. Because the wandering behaviours were determined through the recoding process (Appendices A, E and K) they are not listed in Table B, but the behavioural categories were as similar as possible to those in Table A.

Differences in unrecoded focal data and unrecoded scan data could be attributed to differences in the samples or to differences in the effectiveness of the methodologies in detecting particular behaviours, but not to differences in behavioural definitions. It should be remembered, however, as discussed in the section before Table A, that *true* measures of total occurrence were accurate only for the categories that were prioritized by the hierarchical coding scheme, that is, for the following behaviours: stereotypies and gathering (codes 12, 15, & 16); wayfinding and searching (codes 18, 18+, 18-, 18±,20,20+,20-,20±), unusual (codes 13, 14, 17, & 29); left home (code 01); and unobservable (codes 00, 02, & 09).

Table B

COMPARING ACTIVITY TIME BUDGET PERCENTAGES:

UNRECODED SCAN DATA AND UNRECODED FOCAL DATA

	Focal	Scan	Difference
Walking	8.85	8.55	-0.30
Walking and scanning	0.34	0.00	-0.34
Stereotyp. & Gather	1.71	2.06	0.35
Wayfinding, Searching	0.11	0.00	-0.11
Group walking	2.47	1.77	-0.70
Compliant walking	0.61	1.08	0.47
Transitional movement	1.39	1.28	-0.11
Inactive	49.40	51.03	1.63
Social	14.58	7.67	**-6.91***
Focal Activities	15.11	20.35	5.24
Care Given	0.38	2.16	**1.78***
Unusual	2.44	0.49	-1.95
Left home	0.00	1.77	1.77
Unobservable	2.61	1.77	-0.84
TOTAL	100.00	99.98	0.02

Note: *Significant differences have asterisks. *Left home* appears to be significant but was not tested (see text). A difference with a minus sign signifies the *scan* estimate was smaller than the *focal*.

The unrecoded data for both focal observations and scans were collected by coding schemes that used the same definitions. The only difference between the two coding schemes (Appendices C and I) was that the scheme for focal observations contained momentary events, whereas momentary events were omitted from the scheme for instantaneous scans (cf. Lehner, 1978; in contrast to *state* behaviours that can be timed with a stopwatch, *event* behaviours exist briefly and generally occur so rapidly that one just marks their occurrence; examples of momentary events in the original coding scheme for focal observations, Appendix C, were *cued object use* and *initiating social contact*).

A chi-square goodness of fit analysis was used to statistically test the *observed frequencies* in the originally coded scan data against the *expected frequencies* calculated from the observed durations in the focal data as originally coded (i.e., the behaviour classifications were the unit of analysis). The overall chi-square was 169.40, *df* 12. The only scan frequency that was significantly less than predicted from the durations in the focal data was that for *social* activities (X^2 32.56, *df* 12). The only scan frequency that was significantly greater than expected was that for *care given* (X^2 86.27, *df* 12). Although the size of the difference in the category *left home* appears to be significant, this category was not included in the analysis because no estimate could be obtained from the focal data (cf. Table A; focal observations did not include this information). It is believed that these differences resulted from differences in the effectiveness of the methodologies to detect particular behaviours. That is, instantaneous scans detected more *care given* because in order to locate the participants the observers frequently knocked on closed bedroom doors and then opened the door to check whether the participant was there, unless there was some indication the door should not be opened. Having opened the door, the observer knew not only whether the participant was there but also the behaviour. However, in a focal observation the same scenario resulted only in the initial codes for a session (activity, location, etc.), then, in a few seconds, when the observer closed the door the behaviour was coded as *unobservable*. If the focal session had a sum of more than 3.2 minutes during which the subject was unobservable the session was not used in the analyses in Study 1. Evidently a significant amount of behaviour in the *care given* category was omitted by the focal observations. Because some SDAT participants required more assistance with dressing and grooming than others the omission of periods of caregiving longer than 3.2 minutes affected the data for some participants more than others.

Similarly, all of the evidence for the category *left home* was omitted from focal observations. This was a difference in the sample resulting from differences in the methodologies. As a natural consequence of checking on the whereabouts of all participants, the instantaneous scans included incidents where the participant had *left the nursing home on an approved outing* and as a result was *unobservable* (coder used the unobservable code but noted the reason), but focal observations with similar notation were not used in the analyses in Study 1 because of the decision to omit unobservable periods of long duration from the data. Therefore, a time budget based on the focal data did not represent the participants' real time schedule, but rather the time schedule, given that the observers could keep them in view. The time budget based on instantaneous scans as originally coded, however, was not intrinsically more accurate than the time budget based on focal observations because both data sets included inaccuracies resulting from the hierarchical coding scheme. The lower a behaviour was on the hierarchy, the less accurate the estimate for it may be.

The problem at this level of analyzing differences between the two methodologies was how to include some of the missing information in the focal observations in order to make time budgets based on these observations more realistic. Sackett (1978) has suggested several methods of coping with situations in which the participants are unobservable, but the main problem in the present research was that particular behaviours and unobservable periods were confounded. Sackett indicates that the problem with such data is that it violates a basic premise, the premise that participants will have an equal opportunity to be measured. The opportunity is not equal if some participants had longer durations during which they were unobservable.

> If being unobservable was a behaviour under control of the resident, which voluntarily took him away from opportunities to be observed, it might be concluded that equal opportunity assumptions have not been violated. However, if the reason for being unobservable involuntarily eliminated the possibility of being observed (e.g., leaving the home, being visited by a social worker who took the subject out of the behavioural space for an interview), adjustments for equal opportunity should probably be made. Adjustments proceed under the assumption that behaviours are randomly distributed over the actual period

> of observability. If this is not a valid assumption, adjusted scores may be as misleading as the original values. (Sackett, 1978, p. 34).

The best strategy for handling periods when participants are unobservable would be to adopt codes that reflect the behaviours that occur when the participant is unobservable, instead of grouping all behaviour under one category. The inclusion of instances where the observer was away from the nursing home on an outing, that were a good indirect measure of the social level at which the participants could function, could be coded (or recoded) to reflect the reason that the participants were unobservable. This also could be done when the participants were unobservable because of other important reasons which indirectly measured other competencies or incompetencies.

The method of collecting instantaneous scan data may have been the superior method for the category *care given*, but the method was not as good as focal observations were for detecting *social* interactions. It is believed that some instances in which the participants were actively listening to another person went undetected in scans, whereas, in focal observations the observer could detect, from preceding events, whether the participant was merely looking at a speaker or was actively engaged in the ongoing social exchange (it is likely that most of the significant difference between percentages for the *social* category in Table B could be attributed to observers not being sufficiently aware of the context).

Sackett (1978) has suggested a way of improving instantaneous scan methodology so that the meaning of behaviours would be more evident to the observer. His solution when an instantaneous measurement would probably not lead to a correct classification of behaviour is to take probe samples *at the end* of brief time intervals. Sackett (1978, p. 27) adds that "The length of these short samples might be fixed or variable. The primary consideration is that the length be sufficient to permit unambiguous interpretation of the ongoing activity. Scores for this method would be identical to those described using the instantaneous technique."

The observers collecting the data for Study 4 of the dissertation attempted to follow this strategy by observing a *variable length sample* of behaviour and then coding the behaviour for *a point in time*. However, the social interactions involving SDAT participants may have proceeded at a different rate from that normally expected and, therefore, the observers did not allot enough time to understand the context for social exchanges. However, because there were not similar significant differences between other behaviours in the unrecoded scan data and the unrecoded focal data, the observers must have satisfactorily judged the length of time for other contexts when doing instantaneous scans (but see the suggestion that follows the discussion of recoding *transitional movement*).

Unraveling Differences Caused by Recoding

The analysis of the unrecoded data suggested that there were very few significant differences in data samples obtained using the two methodologies. These differences did not appear to explain the differences in the time budgets derived from the two methodologies after recoding (Table A). The two significant differences in Table B for the *social* and *care given* categories are not evident in Table A.

The recoding process must have been responsible for both the disappearance of the difference for those two categories and the appearance of other significant differences. The question is why did recoding alter the two types of data so that they became more dissimilar than they were originally?

The explanation begins with a look at what recoding accomplished and what it was intended to accomplish. Recoding did one of the tasks intended when it removed the significant difference, noticed in the unrecoded data, for *care given*. The differences disappeared because incidents were recoded as *care given* when the observers' notes indicated that participants were being given care, although the code *unobservable* was being used because it was required by the original definitions for the coding schemes. Thus the focal and scan data became more similar for this behaviour. Because of recoding such incidents and because observers' notes attached to both scan data and focal data sometimes indicated that other codes would have been more appropriate than the code for *unobservable*, the amount of time spent *unobservable* was consequently reduced (cf. Table A with Table B).

The preeminent reason for recoding the focal data was to remove the influence of the hierarchical coding scheme on behaviours involving locomotion. Recoding is necessary with an hierarchical coding scheme to uncover instances where behaviours of interest occurred but the hierarchy required that another code be used originally (cf. Appendix E, Bakeman & Gottman, 1986; Sackett, 1979). The *recoding* rules gave locomotion priority, in order to redefine some locomotion as *restless locomotion* and various other wandering behaviours. Thus *unusual and social* activities lost their original high status and the proportion of time the categories consumed was reduced as a consequence of their switching places with locomotion in the hierarchical coding schemes.

As an example of the original coding rules, if the participant was walking in another person's bedroom *as well as* acting in a delusional fashion the observer would have used a code for the *unusual* delusional behaviour not the locomotive behaviour because the unusual (and social) codes were given precedence in the hierarchical scheme. The locomotion dimension in the original data would have identified that walking occurred through the change in locomotion codes from those for a hallway to those for a private bedroom. In this example, recoding would result in the activity becoming *trespassing* and therefore the concurrent behaviour, *unusual* (delusional) activity, would be lost (Note: the procedure *eventually* had this effect; Appendix E reiterates how a new code, reflecting both activities, was initially assigned to such instances, however, the analyses in Study 1 emphasized trespassing in preference to unusual activities because the new codes represented such a small proportion of total time).

Recoding other behaviours in an analogous manner removed the influence of the hierarchical placement of locomotion with some success in the focal data. The results of this are evident when comparisons are made between Table A and Table B for the behaviours related to locomotion. In Table B according to the focal data these behaviours (walking, walking and scanning, wayfinding and searching, group walking, and compliant walking) accounted for 12.38% of the time. However, in Table A behaviours related to locomotion (the three levels of absconding, navigational difficulty, restless locomotion, searching, trespassing, and purposive walking) accounted for 18.66% of the time (Note: trespassing, accounting for 0.15%, was recoded on the basis of the location code, but the activity code typically was one of the active codes). The *increase by approximately one-half* the original amount reflects the extent to which the locomotive categories were suppressed by their placement in the hierarchical coding scheme.

The extent that any particular category increased depended on a variety of factors. Three such factors were: (1) the number of instances of locomotion that occurred in conjunction with the various *unusual* and *social* behaviours (because these behaviours because less important as in the example just discussed), (2) the number of codes with observers' comments suggesting the behaviour would fit one of the definitions for the wandering behaviours (these were recoded), and (3) the number of *transitional movements* that preceded wandering behaviours and, therefore, because they signified the beginning of a wandering behaviour, were considered part of the behaviour.

Group walking. Group walking was a useful *marker variable* for measuring how the recoding process altered a locomotion code by merely placing it higher in the hierarchy, because there was no change in definition for *group walking*. With only the placement in hierarchy as an influence, the lower estimate in Table B for this category (in the focal data, when compared to Table A) can be attributed to data being lost because of *group walking*'s earlier low placement in the hierarchical coding scheme (the recoding rules placed the behaviour in a dominant position). Evidently *group walking* seldom occurred in conjunction with unusual behaviours or with social interactions because it increased only 0.69% when the calculations from focal data in Table A are compared with the calculations based on focal data in Table B. However, for the *group walking* category in the focal data, that small increase was nearly one-third of its total percentage. At the same time the scan data were not altered because observers gave no indication in their notes that any code that was originally dominant to *group walking* occurred during such locomotion, or that any other the code should have been used in any instance when it was not, therefore, there was no evidence to support any changes in the frequency of this category.

Transitional movement. The behaviour termed *transitional movement* (code 53 in Appendix E) disappeared when the focal data were recoded because the transitions could be added to the duration of the behaviours that followed them. This code was originally devised to handle movement that was so slow and/or indecisive that coders could not label it, Because there was no inherent interest in such movement, the intention was always to consider it part of another movement. Thus, when the transitional movement led to sitting the time for the transition was added to sitting and when the transition led to a form of locomotion, such as *restless locomotion* then the time for the transition was added to that behaviour (cf. Appendix E). Additionally, some transitional movement was recoded as searching when it related to searching and some became fiddling when there was no other explanation for the fidgeting movement. No similar logic could be used to alter the transitional movements coded in instantaneous scans (in Figure 7, study 4, they are called general movement). This coding category would have been better omitted from the coding scheme for instantaneous scans because the category could not be recoded in an analogous manner to the focal data. In instantaneous scans, if observers had increased their *variable length sample* of behaviour before coding the activity for a point in time (as discussed under the heading *comparing unrecoded data*), then the observers could have identified the subsequent behaviour accurately and the code for *transitional movement* would have been unnecessary.

Fiddling. The placement of stereotypic movements and gathering among the *unusual* behaviours in the original coding scheme and the fact that the *unusual* category had a preeminent place in the hierarchy meant that these behaviours, that formed the basis of the *fiddling* category in the recoded data, should not have been changed much by the recoding process. However, the codes gathered together as fiddling for instantaneous scan observations and the codes gathered for fiddling in the focal data differed on two counts. Repeated movement (code 13) was included in the definition for the focal data, but was not included in the definition for the scan data because repeated movement could not be used in the coding scheme for instantaneous scans (the code depended on the observer noticing a behaviour being repeated and therefore was not appropriate in scans). The other difference was that no general or transitional movement (code 53) was included in the instantaneous scan definition, whereas *some* such movement was included in the definition for focal data (when code 53 behaviour was not preparatory to either sitting or locomotion or related to searching and therefore was fidgeting movements). Because transitional movements and repeated movements (which composed a portion of the unusual behaviour in Table B) each accounted for such a small percent of the time in the focal observations (see Table B) one would not have expected a portion of each of them to have substantially increased the amount of fiddling in the recoded data (cf. Table A). Only a small portion of the increased percentage of *fiddling* in the focal data was due to these two behaviours being included in the definition for focal observations but not scan observations. Therefore, in this case, the significant difference between the recoded focal data and the recoded scan data came from observers' notes that indicated they occasionally failed to use the high priority code (code 12, stereotypic behaviours) when it would have been appropriate to do so. Observers made comments such as "fiddling throughout" for periods when they had used the code for *sitting inactive* or *low focal activity*.

Two Methodologies, Two Types of Data, Two Types of Recoding

It is important to notice that for both *group walking* and *transitional movement* that only the focal data were changed to any extent by the recoding scheme. Recoding was more successful with focal data because location, verbal, and awareness dimensions in the data provided redundant information that could be used to interpret the activity dimension, whereas scan data lacked similar information. The recoding of scan data *was limited to new arrangements of the data and reevaluation of the codes in light of the definitions of wandering and observers' comments on the situations*. Thus most of the significant differences, when the time budget obtained from instantaneous scans and the time budget obtained from focal observations are compared (Table A), are due to the differential success of recoding the two types of data. One other factor played a role in these significant differences. Not only were the strategies different to uncover instances in the two types of data of the behaviours of interest, in some cases even the definitions had to be different for the two types of data. The recoding of restless locomotion illustrates this.

Restless locomotion. The recoding of restless locomotion in the focal data was much like that already described for the example of a participant walking *as well as* acting in a delusional fashion. If the participant was engaged in some other behaviour and locomotion, recoding rules gave precedence to the locomotion. When particular locations were repeated many times during a brief span of time, that indicated that participants were repeatedly traversing the same areas, thus, the movement could be recoded as restless locomotion (Appendix E). But that definition was not applicable for scan data.

For scan data the strategy for recoding locomotion was based on location and, as predicted (Appendix K), it underestimated the amount of restless locomotion. The observed frequency for the scan data was approximately one-fifth of that predicted from the durations in the recoded focal data (X^2 82.59, *df* 14; this was the third largest contributor to the overall X^2). This was anticipated because much of the walking done by the SDAT participants in their hallway, their lounge and the crossroad area was expected to be identified as restless locomotion during the recoding of the focal data. However, it was unacceptable to label all locomotion as wandering and it was necessary in recoding scan data to have the same definitions for SDAT and high-functioning participants. Thus, the SDAT participants were given the benefit of any doubt about their locomotion. That is, if the high-functioning participants could be assumed to be making a legitimate request when found at the nursing station, then the SDAT subjects in the same situation had be given the benefit of the doubt and also be assumed to have some legitimate purpose there. Thus purposive locomotion was considered the default code for locomotion in scan data. Instances when the SDAT participant was found walking in the crossroad area, and there was no activity going on in their lounge, the locomotion was considered purposive rather than restless. SDAT participants' locomotion in wards other than their own was considered a form of wandering *unless* there was a valid reason for the participants' presence. Moreover, locomotion on the SDAT ward was considered purposive *unless* there was evidence to suggest the participant was engaged in a wandering behaviour (Appendix K provides more detail on this point). As a consequence it is believed that the recoding strategy used for scan data overestimated *purposive locomotion* and underestimated *restless locomotion*; purposive locomotion was nearly four times more frequent in the scan data than the focal data predicted (X^2 123.83, *df* 14, the second largest contributor to the overall X^2, Table A) and restless locomotion was approximately 4.5 times less frequent (X^2 82.59, *df* 14). These differences resulting from recoding that are evident when the proportion of time spent in restless locomotion and purposive locomotion are compared for the focal- and scan-based time budgets points out the need for definitions that can assure observers will readily discriminate between the two types of locomotion at the time when they occur. There are several ways behaviours could be defined that would allow observers to make these discriminations. The most elegant way would be to identify, through more studies that use lag sequential analyses like Study 1, the sequence(s) of behaviours that denote the beginning of wandering episodes. Another way of approaching the problem is through the use of codes like those for general/transitional movement (code 53) and repeated behaviour (code 13). In using this method, a code like that for transitional movement, could be used when locomotion begins in order to convey that the coder is uncertain of the purpose of the movement and another code, like that for repeated behaviour, could be employed when it became evident that the subject was repeating his or her footsteps. Of course, the utility of this method would need to be tested in pilot research.

If the estimate from the focal data is accurate, the scan estimate does not represent the true extent of this behaviour. Therefore, (off-wing) restless locomotion does not have quite the same meaning in Study 4 that it does in Study 1. However, the 2.8% (off-wing) restless locomotion in Study 4 is the amount of restless locomotion, engaged in by SDAT participants, that would be troublesome to residents on other wards.

Absconding from an activity or room. A second example in which important differences between the two types of data led to different definitions is provided by *absconding from an activity or room.* In this example scan data provide a type information not provided by focal data, that is, in each scan the location and activity of all the other participants in the study were evident for more or less the same point in time. This information and the fact that institutional routines synchronized participants' behaviour to a remarkable degree, helped in recoding the instantaneous scan data. In scan data the location (and behaviour) of all the other participants was recorded which allowed the recoder to judge that if all but the participant were lying in their beds then the participant was absconding (the assumption was made that one would not be allowed to roam while all others had been bedded, which was considered valid for this nursing home given nursing procedures).

In focal data the criteria for recoding locomotion as absconding depended upon rather momentary phenomena making it more difficult to recognize instances of *absconding from a room or activity*. For example, if the data provided evidence that the participant was leaving her or his bedroom after having been bedded, because the momentary event of leaving was recorded *during* the period of observation, then the absconding was evident. However, if the observational period began with the participant walking outside of the bedroom, and it was after the customary bedtime for the SDAT participants, the recoder might suspect the participant had been put to bed on that particular evening, but had no way of knowing whether that was a reasonable assumption or not. It is believed that the difference in these definitions for recoding the scan and focal data accounts for the proportion of time spent in this wandering behaviour being three times greater for the scan data when compared to the focal in Table A (X^2 37.75 *df* 14).

Future Research

Recoding worked satisfactorily with focal data because focal observations provided much contextual detail to determine the nature of the locomotion, recoding was not as successfully with scan data. Although instantaneous scans seemed to be better for detecting several wandering behaviours (such as absconding from a room or activity) the hierarchical coding scheme limited the usefulness of the information for purposes other than that emphasized by the class of behaviours given priority in the scheme (e.g. *unusual* behaviours). The scan data can be considered accurate only for the class of codes that are highest in the hierarchy and for any codes that are inherently mutually exclusive.

In the present research it was desirable for a number of practical reasons, to use, as nearly as possible, the same coding scheme for both focal observations and instantaneous scans. The hierarchical coding scheme, however, introduced problems. Although most authors who discuss methods of behaviour observation mention hierarchical coding schemes the only warnings about the bias they introduce into estimates of frequency and duration are found Sackett's (1979) early discussion of his lag-sequential analysis (cf. the introduction in Appendix E) and in a 15-year old conference publication (Jones, 1973).

Comparing the time budget based on the Study 1 data with the time budget based on the data in Study 4 exposed many problems. As a consequence, in future research, because of the inherent inaccuracies evident in scan data collected with a hierarchical coding scheme, *it would be advisable not to use a hierarchical scheme when doing* *instantaneous scans*. There appears to be no ready way of identifying to what extent the data will be altered by the scheme. As Hartup (1979, p. 19) reminds us "No user's guide exists." More research is needed on the methodologies themselves and a user's guide is long past due.

APPENDIX H

THE WANDERING INDEX

TO ASSESS WANDERING OF DEPENDENT ADULTS

First, tell me in your own words what it means to you when someone is said to wander. What behaviours do you expect to see? What does the term wander mean to you? ________________________

1. Would you call (person's name) a wanderer or a non-wanderer? (Clarify to discern whether yes or no). a. For what reasons do you think that term fits Mrs./Mr. (person's name)? ____________

(Show the respondent a card with the available answers *a* to *e* for Questions 2-12. For items 4, 5, and 7 add the phrase "or on nearly every occasion" to the *e* response.)

(a) never,

(b) seldom,

(c) occasionally, that is, one day but not the next,

(d) frequently, that is, every day,

(e) usually, that is, several times per day?

2.* Would you rate the frequency of her/his wandering as occurring: (a), (b), (c), (d), (e)?

3.* Has she/he been restrained because of wandering, for example is she/he restrained during meals to prevent her/him from wandering away (count confinement by the mealtray of a geriatric chair or any arrangement from which the person cannot remove him- or herself as a restraint): (a), (b), (c), (d), (e)?

4.* On a typical day for Mrs./Mr. (person's name) do you think she/he can find her/his way within the nursing home, for example: from the nursing station to her/his bedroom: (a), (b), (c), (d), (e)?

5.* On a typical day for Mrs./Mr. (person's name) do you think she/he can find the way from the ward lounge to her/his bedroom: (a), (b), (c), (d), (e)?

6.* Does she/he enter other individuals' private bedrooms without invitation: (a), (b), (c), (d), (e)?

7.* Does she/he require guidance in order to get from one specific location in the nursing home to another, for example from one floor, to an other or to the main dining room: (a), (b), (c), (d), (e)?

8.* Is she/he a person whom you see fiddling with objects: (a), (b), (c), (d), (e)?

9.* Does she/he give you the impression she/he is carrying out a search for particular objects or people (e.g., objects that she/he might even say are missing such as eyeglasses, or a missing child, or some unattainable object from the past or person that is not available e.g., a dead relative, a distant city): (a), (b), (c), (d), (e)?

10.* Is she/he a person who walks around without having any particular purpose: (a), (b), (c), (d), (e)?

11.* Is it Mrs./Mr. (person's name) nature to leave the ward and *become lost* within the nursing home so that staff must search for her/him: (a), (b), (c), (d), (e)?

12.* Is it Mrs./Mr. (person's name) nature to leave the nursing home so that staff must search for her/him: (a), (b), (c), (d), (e)?

13. Has Mrs./Mr. (person's name), to your knowledge, ever left the (floor) ward and *become lost* within the nursing home so that staff must search for her/him? (Indicate the answer expected is no/yes.)

14.* How often do you recall that this happened? (Show the respondent a card with the available answers *a* to *e* for Questions 14 and 16:

(a) never,

(b) once or twice,

(c) three or four times,

(d) five or six times,

(e) more than six times?)

15. Has Mrs./Mr. (person's name), to your knowledge, ever left the nursing home so that staff must search for her/him? (Indicate the answer expected is no/yes.)

16.* How often do you recall that this happened? (the available answers are the same as for item 14) (a), (b), (c), (d), (e)?

Note: The items are repeated for each of the residents in turn.

Scoring: To score items 2, 3, 6-12, and 14, count 0 points for an answer of *a*, 1 point for *b*, 2 points for *c*, 3 points for *d*, and 4 points for *e*. Scoring was reversed for items 4 and 5, that is, *e* was scored as 0 points and *a* was scored as 4 points. The sum of items marked with an asterisk (*) produced the wandering index score. Items 1, 13, and 15 are not used in the index because they are answered on a different scale from other items.

THE WANDERING INDEX INSTRUCTIONS

Interviews were conducted in private with each individual caregiver. After greeting the caregiver the researcher said: "I would like to ask you some questions. Most of them are questions about each of a number of residents. Please be assured that all of your answers will be held in the strictest confidence and your name will not be associated with the answers. That is, no one other than myself will know how *you* answered any of these questions."

The researcher read the first statement of the questionnaire and provided a clipboard with lined paper and a pen for the caregiver to write an answer to the first item. The questions that are part of item 1 were used as prompts.

Next the researcher said, "I would like you to recall the period of time during which the observers from the university were in the nursing home. That's nearly a year ago. Would you please answer the following questions *for that period of time* for each of the residents as I give you their names?"

A photo of the resident made at the start of the research was shown to the caregiver as a prompt to show the caregiver how the participant looked at the time of the research and to assure that the researcher asked about the correct participant. (Coders and the researcher always referred to participants by a two letter code to protect participants' privacy; codes assured that any anecdotes related by coders to fellow students would not identify the participant. Two letter codes were reduced to a single letter in the dissertation to further protect participants' anonymity.)

Each questionnaire item from 2 to 15 was read in turn. The caregiver was shown a card with the answers from which she could choose. Separate cards were used for the two forms of the Likert scale answers (i.e., answers for items 2-13 and 15, as well as, items 14 and 16). The researcher coded verbal answers on an computer-read score sheet with which she was very familiar. Caregivers were encouraged to answer all items. If an the caregiver refused for any reason, the reason was noted and the item was noted as missing. Item 1 was asked only once for each caregiver. As the items 2-15 were asked for each SDAT participant, the caregiver was shown the participant's photo and reminded that the questions applied to the period when the university group were in the nursing home.

At the end of the interview the following was said: "How many years have you worked in this nursing home? Because people with training in geriatric care often have special knowledge about problems such as wandering, I'm interested in whether you have training that would give you such knowledge. Have you taken any special training for your nursing position here? (The researcher determine whether the caregiver was a registered nurse or a registered nursing aide.) Was wandering discussed in your training? Is that where you get your ideas about wandering? (OR) Do you get your ideas about wandering from your day-to-day work?"

"Thank you for helping me by answering these questions. I'm going to ask you *not* to discuss the questions or your answers with other staff members until I've finished asking the same questions of everyone else who worked frequently on D-wing during the period of the study. The reason I'm asking this is because I want everyone's own ideas and discussing the questions may cause some people to be influenced by other staff members' ideas. Is it okay with you not to discuss it until I'm all finished?" (The researcher obtained verbal agreement.) "I'll be in touch to let you know when I'm finished. Thanks."

APPENDIX I

CODING SCHEME FOR INSTANTANEOUS SCANS OF INSTITUTIONALIZED PERSONS[44]

OBSERVER'S COMMENTS: Observers may add situational information to any behaviour code.

I. LOCATION (A coded version of the facility map was used by observers. It had 174 codes and is not provided. The function of the location was used to condense the codes for analyses. The general floorplan is Figure 7 of the dissertation.)

II. ACTIVITY

NIL BEHAVIOURS

00	not found	
01	left nursing home	
02	can't observe	
09	*other reason*	* specify what

UNUSUAL BEHAVIOURS

12	stereotypic	
14	delusion/hallucination	
15	inappropriate use of object	* specify what
20	help finding an object	(+ verbal, - physical, +_ both)
29	*other*	* specify what

SOCIAL

32	continuing	(+ positive, - negative)
33	inappropriate	(+ positive, - negative)
39	*other*	* specify what

ACTIVE (APPROPRIATE)

41	symbolic	(be conservative)
42	self-generated	(not care behaviours, be conservative)

43	external	
44	object use	(- unexpected quality)
46	self care	
47	cued care	
48	walk-search/scan	(+ head up, - head down)
51	walking	(+ head up, - head down)
52	group walking	
53	general movement[45]	(any other)
54	compliant walking	
55	total care	
56	self-movement in a wheelchair	
59	*other*	* specify what

INACTIVE

61	stand-search/scan	(+ head up, - head down)
62	stand	
63	sit	
64	dozy	
69	*other*	* specify what

III. SUBJECT CODES

SDAT Subjects:

G	(female)	P	(female)
H	(female)	E	(female)
L	(female)	N	(female)
M	(female)	S	(male)
I	(female)	T	(female)
H	(female)	E	(female)

High-functioning Subjects:

An	(female)
Bn	(male)
Fn	(female)
Jt	(female)
Ml	(female)
Wd	(female)
My	(female)
Nl	(female)
Ry	(female)

[44] The format of the coding scheme was derived to an large extent from a scheme used for retarded adults by Landesman-Dwyer et al. (1976) although only one section of their scheme was hierarchical. The coding scheme behaviours were chosen by the author and A. L. Milke and were used to train observers for an exploratory study of the institutional behaviour of demented persons. Comments from observers Viviane Houle and Wendy Greth-Sapiea were very helpful. Full definitions of the behaviours in the coding scheme are in Appendix D. However, this coding scheme does not contain all of the behaviours described in Appendix D because the inclusion of momentary behaviours is not appropriate in instantaneous scan coding schemes (Lehner, 1979; Sackett, 1978).

[45] This code would have been better omitted. Coders should observe the contextual setting of activities long enough to determine what code would be appropriate to use instead of code 53 (cf. Appendix G).

APPENDIX J

INSTRUCTIONS FOR SCAN OBSERVATIONS[46]

A. General Procedures and Information

In instantaneous scan sampling the observer scores each participant's behaviour at predetermined points in time. Because the behaviours of each of a large number of participants are to be scored within a 10 minute period of time it is necessary for the observer to locate all participants and code the required information for each one as rapidly as possible. It is necessary, however, to observe each participant long enough to determine the activity precisely. The amount of time spent to determine the correct activity will vary according to the activity. The primary consideration is that the length be sufficient to permit unambiguous interpretation of the ongoing activity. However, after the observer has determined the context for the participant's behaviour then the observer must sample and record the activity for *a point in time at the end* of this variable length observation period and not use the code that characterizes the behaviour while the observer was determining the context (Sackett, 1978). A number of texts (Lehner, 1979; Martin & Bateson, 1987; Sackett, 1978) have warned that instantaneous scans should not be a series of short focal subject samples of unknown duration because such a method would lead to inaccurate estimates of frequencies and durations, therefore, it is important that the observer samples are for a point in time. Observers are asked to record the duration for each scan by recording the exact time that they start and finish.[47] Scans are recorded in ink on preprinted forms.[48] Scans are optimally made 30 minutes apart and the minimum time between the end of one scan and the beginning of another should not be less than 15 minutes.

Observe as unobtrusively as possible. You should not gaze directly at a participant and any brief glances should be brief. The avoidance of direct eye contact with participants and staff members will prevent further contact that may bias the accuracy of an observation.

To check interobserver reliability it is necessary for two observers to move together and it usually will be necessary for them to verbally mark the point in time when the behaviour of each participant is being sampled. Observers should compare their scans only after the scan has been completed; *do not compare notes while coding*. Discuss any discrepancies and if you agree *post hoc* that one code is more accurate than another then, on both scan checklists, circle the pair of codes that show a discrepancy with red ink and mark in red the preferred code. Otherwise *do not change* the codes you originally entered because changes invalidate the interobserver reliability. Cohen's kappa statistics are calculated on unaltered codes.

B. Travel Procedures and Related Coding Information

To assist in locating the participants rapidly a travel pattern has been devised for observers:

1. Record the exact time and start from D-wing lounge to quickly determine who among the SDAT participants are not there.[49]

2. Check the fire stairwell by looking through the glass panel. Do not open the door because SDAT residents may model the behaviour.

3. Proceed toward the nursing station, quickly checking the bedrooms of D-wing as you pass. Knock and open closed bedroom doors but do not do anything except ask if a participant is present particularly if a toilet door is closed.

4. Check in turn: the kitchen, office areas, the main stairwell (do not open the door), the elevator if the doors are open and look down C-wing hall, A-wing hall, and B-wing hall.

5. Check the central bathing area (several bathtubs and two toilets) by asking loudly for any participant who has not been located yet.

6. Walk down and unobtrusively check in bedrooms with open doors: B-hallway, then check B-lounge and patio; C-hallway, then check C-lounge and patio; and A-hallway, then check A-lounge and patio.

7. Ask D-wing nursing assistant and/or the ward clerk for the whereabouts of any participant that still has not been located (hairdressing appointments and activities planned by recreation staff may take both SDAT and high-functioning participants off the floor).[50] Check the register to see the participant has not (been) signed out. Check the recreation schedule for likely activities and their location.

8. If a participant cannot be found after (a) all of the above checks and (b) after inquiries have been made of *all staff members on the floor*, then the participant is coded as being in an unknown location, engaged in an unknown activity, and is presumably not restrained. If the observer later finds that she was in error, for example, the participant was discovered to be at a planned function,

then the scan should be corrected after the observer has verified the information with the person most apt to have correct information. *Otherwise do not change the codes you originally entered.*

9. The observer should record the time when the information was entered for the last participant to be located.

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[46] These instructions were developed by Amylee Milke and the author while the author was supported by a grant from National Sciences and Engineering Research Council of Canada.

[47] Lehner (1979) advises observers to also estimate the amount of time they spend scanning individuals.

[48] The checklist used for each scan had an initial blank to record the date, the real time, and the observer's code. There was a line for each participant identified by her/his individual code and then three blanks to record the information required at the point when the scan was made: the code of the participant's location, the code for her/his activity, and whether the participant was restrained or not (followed by the participant's bedroom code for the date of the scan, a feature made necessary because one of the high-functioning participants changed bedrooms mid-way through the study).

[49] It was necessary to obtain information in some orderly prearranged manner, such as recording information for the participant on the left and going clockwise around the room.

[50] The location of participants who are off the floor should be checked.

APPENDIX K

INSTANTANEOUS SCAN OPERATIONAL DEFINITIONS FOR WANDERING BEHAVIOURS AND PURPOSIVE LOCOMOTION

Instantaneous scan data and continuous data required different operational definitions and different recoding strategies because of differences in the behavioural information in each type of data. The sequential nature of continuous data allowed the preceding and subsequent activities, locations, verbal utterances, and awareness codes to be used in recoding activity data. Instantaneous scan data, however, had only a single activity behaviour recorded along with the location of the activity for each participant at each scan. Additionally, observers added written notes to instantaneous scan data to help interpret particular codes (e.g., whether the participant was being returned to the ward, whether the participant was visiting rather than trespassing and why the participant was away from the ward). Instantaneous scan data had another type information not provided by continuous data, that is, in each scan the location and activity of all the other participants in the study were evident for more or less the same point in time. This information plus the fact that institutional routines synchronized participants' behaviour to a remarkable degree, helped in recoding the instantaneous scan data. This is discussed more explicitly below.

Purposive Locomotion and Restless locomotion

Purposive locomotion, which was not considered a wandering behaviour, was the default code for locomotion. It was made the default in an attempt to match as closely as possible the strategy used for recoding locomotion in the continuous data. Thus, the code from the original coding scheme for ordinary walking (code 51) was considered purposive locomotion unless there was evidence to suggest it was not purposive. In the instantaneous scan data purposive locomotion was distinguished from restless locomotion on the basis of the participants' location, observer notes and the location of other participants. Locomotion in wards other than the participant's ward was considered a form of wandering unless there was a valid reason for the participants' presence in the location (e.g., visiting another resident, obtaining a service, or attending a planned function). However, unless there was evidence to suggest the participant was engaged in a wandering behaviour, if the participant was in her or his room or in the public areas of his or her nursing wing, then the locomotion was considered purposive. Because pilot work indicated that much of the walking done on the SDAT participants' own ward was restless locomotion, this definition will underestimate the amount of restless locomotion in comparison to estimates from continuous observation. Another method would be to label all SDAT participants locomotion as wandering and this was considered unacceptable.

Participants' locomotion that was escorted by a staff member was also considered a purposive form of locomotion. Thus staff members escorted SDAT participants to an from activities off the second floor nursing ward and they routinely toileted SDAT participants. This escorted locomotion was defined as a particular code, compliant walking (code 54), in the original coding scheme. It was considered purposive locomotion because the locomotion had purpose, it was not a wandering behaviour (although the immediate purpose may have been provided by the staff member, the well-being of the participant was the underlying reason for trips to a toilet and recreation activities). Compliant walking (code 54) was not considered purposive locomotion, however, if the observer recorded that the participant was being retrieved by a staff member from a location that was out-of-bounds or that the participant was being returned to a room or activity from which she or he had absconded.

The definitions of purposive locomotion and restless locomotion were the same for high-functioning residents and SDAT participants. Including locomotion in wards other than the participant's ward as a form of wandering unless without a purpose was considered valid for this nursing home because residents were expected to remain on their own ward. SDAT participants were actively discouraged from entering the high-functioning ward and the high-functioning participants avoided contact with other wards, especially the ward housing SDAT residents. Those who entered other wards were contravening social mores unless there was a specific reason for their presence. Thus, a stroll through bedroom wings of other residents by SDAT or high-functioning residents would qualify as restless locomotion and strolling arm in arm or hand-in-hand would qualify as group walking.

However, the fact that high-functioning participants were expected to travel within the nursing home without staff assistance and without obtaining prior permission did necessitate some variation in the operational definitions of the wandering behaviours. For example, merely leaving second floor would not qualify as absconding for the high-functioning participants, while it did qualify as absconding for the SDAT participants. If high-functioning participants were found on first floor (which, like second floor, was all bedroom wings) without a purpose or were found in an area of main floor that was not deemed a public area without a purpose, that would qualify as a wandering behaviour. It might be trespassing or having navigational difficulty (the undifferentiated corridors and the similarity of the two bedroom floors made the latter a strong possibility).

The seven operational definitions of wandering activities are:

1. *Absconding/escape from a room, nursing unit, or building*: As in recoding continuous data (Appendix A & D), all levels of absconding could be part of an observational session and the distance attained or the location reached were considered important.

For an instance of absconding from the nursing home itself, the participant would have to be outside of the nursing home without permission. For the SDAT participants this meant being out without being accompanied by a responsible adult. For the high-functioning participants this meant being out without signing themselves out in the registry kept for that purpose. No inference about absconding of this type was made unless the observer's comment made explicit reference to the event.

For absconding from the second floor the participant would have to be away from the second floor without permission. For the SDAT participants this meant being on the first or main floor without being accompanied by a responsible adult. Because high-functioning participants were permitted to leave the floor without notification to staff, they were considered to have absconded from the floor if they left it when scheduled for assistance with a bath or some other nursing service.

Absconding from an activity or room where the participant was expected to stay, was observed when the participant was absent without an explicit reason while all other participants were noted to be involved in their meal or a similar group activity.

2. *Lost/navigational difficulties*: Operationally, having navigational difficulties and/or being lost was demonstrated by the participant visually scanning the environment at a choicepoint (whether the participant was walking, code 48, or standing during the scan, code 61). Several codes in the original coding scheme indicated that the participant was having navigational difficulties or was lost within the nursing home. Thus the following were counted as instances of navigational difficulty, instances when the participant received help with wayfinding (code 18), or the participant requesting wayfinding information (code 13), or was visually scanning the environment at a choicepoint (if the participant was walking code 48 was used, if standing during the scan code 61 was used). If the observer's comment made explicit reference to the participant making a wayfinding error that too was counted as an instance of navigational difficulty.

3. *Restless locomotion*: Restless locomotion was defined as locomotion (including wheelchair movement), with no obvious purpose, in places considered inappropriate for such activity and/or locomotion, with no obvious purpose, at inappropriate times. Two codes from the original coding scheme were operationally defined as restless locomotion. One, the code for a characteristic shuffling gait (code 59) noted in SDAT pilot subjects, was always counted as restless locomotion. The other code was that for ordinary walking

(code 51). The latter was classified as restless locomotion when it occurred in areas where, or at times when, the participant was expected not to go. For example, no participant was expected to enter another's private bedroom unless invited to do so. Other areas such as the space behind the counter at the nursing office were considered out-of-bounds. Moreover, the mores prevalent in the nursing home placed constraints on the residents entering bedroom wings other than their own unless some specific purpose required it. Locomotion in these areas that were customarily forbidden, whether by a high-functioning or SDAT participant, was considered to be restless locomotion.

Locomotion that occurred at times considered inappropriate was also classified as restless locomotion. As discussed above, institutional routines synchronized residents' behaviour to a remarkable degree and participants, both high-functioning and SDAT, were expected to be in certain places at certain times unless they had a good reason for their absence. For example, residents were expected to attend meals at particular times, but illness was a good reason for nonattendance. Thus, the activity and location of the participants' group and the distance the participant was from the group could be used to determine whether the participant was engaged in a wandering behaviour. Following from this, an SDAT participant's presence at the nursing station during his or her meal could be interpreted as a wandering behaviour because any need that could have been filled at the nursing station could have been filled by the nursing staff who were present during the D-wing meal. Similarly, the presence of a high-functioning participant, or an SDAT participant, in the lounge of a bedroom wing other than his or her own, without a discernible purpose, was taken as an indication that the participant was restlessly walking about (or having navigational difficulty if observers' comments indicated the latter). For all participants such behaviour was considered a form of wandering.

4. *Fiddling or stereotypic movement and unusual handling of objects*: Fiddling, a term for the fiddling and fidgeting movements noticed by Meacher (1972; cf. Snyder et al., 1978) as well as the stereotypic behaviours observed by Hussian and Davis (1983, cited in Hussian & Davis, 1985) was operationally defined as being equivalent to several codes in the original coding scheme. These were stereotypic or repetitive hand and body movements (code 12), inappropriate object use or object manipulation (code 15), and inappropriate gathering of objects (code 16). Additionally, the code for idiosyncratic unusual behaviours was considered stereotypic activity (code 29, which was typically used for movements that were unique to the participant such as a motion simulating the wood-planing of a handrail, or sanding motion, if the code was employed for some other unusual activity the observer was to note the fact). The codes gathered together as fiddling for instantaneous scan observations and the codes gathered for fiddling in the focal data (Study 1) differed on two counts. Code 13 was included in the definition for the focal data, but was not included here because the code was not part to the coding scheme for instantaneous scans (the code depended on behaviour being repeated and therefore was not apt to be seen in scans). The other difference was that no code 53 behaviour (fidgeting movement) was included in the instantaneous scan definition, whereas *some* code 53

behaviour was included in the definition for focal data (when code 53 behaviour was not preparatory to either sitting or locomotion or related to searching).

5. *Searching*: Searching, defined as the pursuit of attainable goals, was operationally defined as a code in the original coding scheme that indicated the participant was engaged in a search (code 20). Two more of the original codes (48 and 61), were considered searching, however, whenever the observers' comments indicated a search was being conducted.

6. *Trespass*: Trespassing was defined as entry into other individuals' private territory, or occupation of, another's bedroom when not accompanied by staff or invited by the occupant. Trespassing was determined through the locational codes in the coding scheme because they provide a means of the presence of a participant in another person's private bedroom. When the participant was not accompanied by staff or there was evidence that the participant had not been invited by the occupant (e.g., the occupant was not present) this was counted as trespassing.

7. *Restless group walking*: Group walking was defined as restless locomotion by two or more residents. Operationally, this behaviour was identical to the code for group walking (code 52) in the original coding scheme. Whenever the participant was involved in restless locomotion with one or more other residents and was not being escorted to a location by a staff member, the locomotion was coded as group walking.